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NUREG-2182
Volume 2

Final Safety Evaluation Report for the Combined License for Enrico Fermi 3

Docket Number 52-033

DTE Electric Company

Chapters 10 to 20
Appendix A

Office of New Reactors

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ABSTRACT

This final safety evaluation report[1] (FSER) documents the U.S. Nuclear Regulatory Commission (NRC) staff's technical review of the combined license (COL) application for the Enrico Fermi Unit 3.

In a letter dated September 18, 2008, DTE Electric Company (DTE, formerly Detroit Edison Company[2]) submitted an application to the U.S. Nuclear Regulatory Commission (NRC or the Commission) for a COL to construct and operate an Economic Simplified Boiling-Water Reactor (ESBWR) pursuant to the requirements of Section 103 and 185(b) of the *Atomic Energy Act of 1954 as Amended (AEA),* Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications and Approval for Nuclear Power Plants," and the associated material licenses under 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"; 10 CFR Part 40, "Domestic Licensing of Source Material"; and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." This reactor will be identified as Fermi 3 and will be located on the existing Fermi site in Monroe County, Michigan. The initial application incorporated by reference the General Electric-Hitachi's (GEH's) application for the ESBWR design certification, as described in Revision 4 of the design control document (DCD) (submitted September 8, 2007). In a letter dated October 31, 2014, (COL application submittal Revision 8), the applicant incorporated by reference ESBWR DCD, Revision 10. The results of the NRC staff's evaluation of the ESBWR DCD are in NUREG–1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor Standard Design," and its supplement.

[1] This FSER documents the NRC staff's position on all safety issues associated with the combined license application. The Advisory Committee on Reactor Safeguards (ACRS) independently reviewed those aspects of the application that concern safety, as well as the advanced safety evaluation report without open items (an earlier version of this document), and provided the results of its review to the Commission in a report dated September 22, 2014. This report is included as Appendix F to this SER.

[2] By letter dated December 21, 2012, the Detroit Edison Company informed the NRC that effective January 1, 2013, the name of the company would be changed to "DTE Electric Company." The legal entity remains the same.

This FSER presents the results of the staff's review of information submitted in conjunction with the COL application, except those matters resolved as part of the referenced design certification rule. In Appendix A to this FSER, the staff has identified certain license conditions and inspections, tests, analyses and acceptance criteria (ITAAC) that the staff recommends the Commission impose, should the COL be issued to the applicant. In addition to the ITAAC in Appendix A, the ITAAC found in the ESBWR DCD Revision 10, Tier 1 material will also be incorporated into the COL should the COL be issued to the applicant.

On the basis of the staff's review [3] of the application, as documented in this FSER, the staff recommends that the Commission find the following with respect to the safety aspects of the COL application: 1) the applicable standards and requirements of the Atomic Energy Act and Commission regulations have been met, 2) required notifications to other agencies or bodies have been duly made, 3) there is reasonable assurance that the facility will be constructed and will operate in conformity with the license, the provisions of the Atomic Energy Act, and the Commission's regulations, 4) the applicant is technically and financially qualified to engage in the activities authorized, and 5) issuance of the license will not be inimical to the common defense and security or to the health and safety of the public.

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[3] An environmental review was also performed of the COL application and its evaluation and conclusions are documented in NUREG-2105, "Final Supplemental Environmental Impact Statement for Combined License (COL) for Enrico Fermi Unit 3."

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ABBREVIATIONS

A&NS	alert and notification system
A2LA	American Association for Laboratory Accreditation
ABWR	advanced boiling-water reactor
ac	alternating current
ACA	Anorthosite Complex Anomaly
ACES	Automated Coastal Engineering System
ACLASS	ACLASS Accreditation Services
ACI	American Concrete Institute
ACP	access control point
ACRS	Advisory Committee on Reactor Safeguards
ADAMS	Agencywide Documents Access and Management System
ADB	ancillary diesel building
ADG	ancillary diesel generator
ADS	automatic depressurization system
AEA	Atomic Energy Act
AEOF	Alternate EOF
AF	amplitude function
AFT	as-found tolerance
AFU	air filtration unit
AHEX	Atlantic Highly Extended
AHS	auxiliary heat sink
ALARA	as low as reasonably achievable
ALT	as-left tolerance
ANI	American Nuclear Insurers
ANS	American Nuclear Society
ANSI	American National Standards Institute
ANSS	Advanced National Seismic System
AOO	anticipated operational occurrence
AOV	air-operated valve
API	American Petroleum Institute
AQCR	Air Quality Control Region
ART	adjusted reference temperature
ASA	applicable safety analysis
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASCE	American Society of Civil Engineers
ASR	alkali-silica reaction
ASTM	American Society of Testing and Materials
ATWS	anticipated transient without scram
AV	allowable value

B&V	Black & Veatch
BDBE	beyond-design-basis event
BE	best estimate
BL	bulletin
bpf	blows per foot
BPV	Boiler and Pressure Vessel
BPVC	Boiler and Pressure Vessel Code
BRE	bullet resisting enclosure
BTP	branch technical position
Btu	British thermal unit
BWR	boiling-water reactor
C	Celsius
cc	Cubic-centimeters
C&FS	condensate and feedwater system
CAM	continuous air monitor
CAR	corrective action request
CAS	central alarm station
CAV	cumulative absolute velocity
CB	control building
CD-144	card deck-144 (format used in NCDC meteorological data)
CDA	critical digital asset
CDF	core damage frequency
CDI	conceptual design information
CEM	Coastal Engineering Manual
CENA	central and eastern North America
CEUS	central and eastern United States
CEUSSSC	Central and Eastern United States Seismic Source Characterization
CF	chemistry factor
cfm	cubic feet per minute
CFR	*Code of Federal Regulations*
CHS	Charleston
CHV	Charlevoix
CIRC	circulating water system
CLSM	controlled low-strength material
cm	centimeter(s)
CMZ	Commerce fault zone
COCORP	Consortium for Continental Reflection Profiling
COL	combined license
COLA	combined license application
COLR	Core Operating Limits Report
COOP	Cooperative Observation Program
CPS	condensate purification system
CR	control room
CRD	control rod drive

CRHA	control room habitability area
CS&TS	condensate storage and transfer system
CSAT	Cyber Security Assessment Team
CSDRS	certified seismic design response spectra
CSF	condensate storage facility
CSIRT	Cyber Security Incident Response Team
CSP	cyber security plan
CST	condensate storage tank
CVAP	Comprehensive Vibration Assessment Program
CWS	circulating water system
DAC	design acceptance criteria
DAW	dry active waste
DB	dry bulb
DBA	design-basis accident
DBE	design-basis event
DBT	design-basis threat
DBT	design basis tornado
DC	design certification
dc	direct current
DCA	Design certification application
DCD	design control document
DCF	damping correction factor
DCIS	distributed control and information system
DCR	design certification rule
DCRA	Design Centered Review Approach
DE	deagregation earthquakes
DEM	digital elevation model
DG	diesel generator
DGFOSTS	diesel generator fuel oil storage and transfer system
DM	direct method
DOE	Department of Energy
DOT	Department of Transportation
DPV	depressurization valve
D-RAP	design reliability assurance program
DTE	Detroit Edison Company
DTPG	defined test plan group
DZO	depleted zinc oxide
EAB	exclusion area boundary
EAC	emergency alternating current
EAL	emergency action level
EAS	emergency alert system
ECC-AM	Extended Continental Crust – Atlantic Margin
ECCS	emergency core cooling system

ECGH	East Continent Gravity High
ECL	effluent concentration limit
ECRS	east continent rift system
ED	emergency director
EDG	emergency diesel generator
EF	Enrico Fermi
ELAP	extended loss of alternating current power
EMD	emergency management division
EMDG	extensive damage mitigation guideline
EMI	electromagnetic interference
EMS	emergency medical service
ENS	emergency notification system
EOC	emergency operations center
EOF	emergency operations facility
EOL	end of life
EOP	emergency operating procedure
EP	emergency planning
EP	Emergency Preparedness
EP ITAAC	emergency planning inspections, tests, analyses, and acceptance criteria
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 2005
EPG	emergency procedure guideline
EPIP	Emergency Plan Implementing Procedure
EPRI	Electric Power Research Institute
EPZ	emergency planning zone
EQ	environmental qualification
EQD	environmental qualification document
EQMEL	Environmental Qualification Master Equipment List
ER	environmental report
ERDS	emergency response data system
ERF	emergency response facility
ERM-N	Eastern Rift Margin – North
ERM-S	Eastern Rift Margin – South
ERO	emergency response organization
ESBWR	economic simplified boiling-water reactor
ESF	engineered safety feature
ESP	early site permit
ETE	evacuation time estimate
ETS	emergency telecommunications system
E_{ur}	unload-reload modulus
F	Fahrenheit
FAC	flow-accelerated corrosion
FAPCS	fuel and auxiliary pools cooling system

FATT	fracture appearance transition temperatures
FB	fuel building
FDA	Final Design Approval
FE	finite element
FEA	finite element analysis
FEIS	Final Environmental Impact Statement
FEM	finite element model
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFD	fitness for duty
FFS	free flow speed
FHA	fire hazards analysis
FHA	fuel handling accident
FIRS	foundation input response spectra
FIV	flow-induced vibration
FLEX	diverse and flexible coping strategy
FMG	failure mode group
FNPP	Fermi Nuclear Power Plant
FPS	fire protection system
FPWS	fire protection water system
FR	Federal Register
FRMAC	Federal Radiological Monitoring and Assessment Center
FRPP	fiberglass reinforced polyester pipe
FRS	floor response spectra
FS	factor of safety
FSAR	final safety analysis report
FSER	final safety evaluation report
ft	feet/foot
FTS	Federal Technology Services
FWSC	fire water service complex
g	acceleration of gravity
Ga	billion years ago
GALL	generic aging lessons learned
GCRP	Global Change Research Program
GDC	general design criterion/criteria
GDCS	gravity-driven cooling system
GE	General Electric
GEH	General Electric – Hitachi (Nuclear Energy)
GFTZ	Grenville Front Tectonic Zone
GI	generic issue
GIA	glacial isostatic adjustment
GL	generic letter
GLERL	Great Lakes Environmental Research Laboratory
GLIMPCE	Great Lakes International Multidisciplinary Program on Crustal Evolution

GMH	Great Meteor Hotspot
GMM	ground motion model
GMPE	ground motion prediction equation
GMRS	ground motion response spectrum
gpm	gallons per minute
GPS	global positioning system
GSI	generic safety issue
GSI	geological strength index
GTG	generic technical guidance
GTS	generic technical specification
GWMS	gaseous waste management system
hr	hour
HAB	hostile action based
HCLPF	high confidence of low probability of failure
HCM	Highway Capacity Manual
HCU	hydraulic control unit
HEC	Hydrological Engineering Centers
HEC-HMS	Hydrological Engineering Centers-Hydrological Modeling System
HEPA	high-efficiency particulate air
HF	high frequency
HFE	human factors engineering
HFI	human factor issue
HMR	Hydrometeorological Report
HMS	Hydrological Modeling System
HPM	human performance monitoring
HPN	Health Physics Network
HPS	Health Physics Society
HRA	human reliability analysis
HUSWO	Hourly U.S. Weather Observations
HVAC	heating, ventilation, and air conditioning
HWCS	hydrogen water chemistry system
Hz	Hertz
I&C	instrumentation and control
IAS	International Accreditation Service
IBC	International Building Code
IBEB	Illinois Basin Extended Basement
IC	isolation condenser
IC/PCC	isolation condenser/passive containment cooling system
ICS	isolation condenser system
IE	inspection and enforcement
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
IFR	Interim finding report

IGLD	International Great Lakes Datum
ILAC	International Laboratory Accreditation Cooperation
IN	information notice
in.	inch(es)
INPO	Institute of Nuclear Power Operations
IPCS	integrated plant computer system
IR	intermediate range
ISFSI	independent spent fuel storage installation
ISG	interim staff guidance
ISHD	Integrated Surface Hourly Data
ISI	inservice inspection
IST	inservice testing
ITAAC	Inspections, tests, analyses, and acceptance criteria
ITC	International Transmission Company
ITP	initial test program
ITS	International Transmission Company
JFD	joint frequency distribution
JIC	joint public information center
JLD	Japan lesson-learned project directorate
JPIC	joint information center
ka	thousand years ago
KI	potassium iodide
km	kilometer(s)
kPa	kilopascals
kV	kilovolt
L-A-B	Laboratory Accreditation Bureau
LAN	local area network
LB	lower-bound
lb/ft^2	pounds per square-foot
LCO	limiting condition for operation
LF	low frequency
LiDAR	light detection and ranging
LLEA	local law enforcement agency
LLNL	Lawrence Livermore National Laboratory
LLRW	low-level radioactive waste
LOA	Letters of Agreement
LOCA	loss-of-coolant accident
LOLA	loss of large area
LOOP	loss-of-offsite power
LOPP	loss of preferred power
Lpm	liter per minute
LPZ	low population zone

LR	lower-range
LSS	low strategic significance
LTOP	low temperature overpressure protection
LTR	licensing topical report
LTSP	limiting trip setpoint
LWMS	liquid waste management system
LWR	light water reactor
M	magnitude (earthquake)
m	meter(s)
M&TE	measuring and test equipment
Ma	million years ago
MASR	minimum alternating stress ratio
MBtu	one million BTU
MC&A	material control and accounting
MCL	management counterpart link
MCPR	minimum critical power ratio
MCR	main control room
MCWB	mean coincident wet-bulb
MDCH	Michigan Department of Community Health
MDCT	mechanical draft cooling tower
MDEQ	Michigan Department of Environmental Quality
MEB	modified energy balance
MEI	maximally exposed individual
MEMP	Michigan Emergency Management Plan
MGA	Mid-Michigan Gravity Anomaly
MHz	megahertz
m_i	material index
mi	mile(s)
MIDC	Midcontinent-Craton
MIS	marine isotope stage
MJ	megajoules
MMGH	Mid-Michigan Gravity High
MMIS	man-machine interface system
MMP	Meteorological Monitoring Program
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MOV	motor-operated valve
MPa	megapascals
MPaG	megapascals gauge
mph	miles per hour
MPSC	Michigan Public Service Commission
MR	maintenance rule
MRA	Mutual Recognition Arrangement
MRCSP	Midwest Regional Carbon Sequestration Partnership

Mrem	millirem
MRS	midcontinent rift system
MSM	modified subtraction method
MST	mitigative strategies table
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NACE	National Association of Corrosion Engineers
NAP	Northern Appalachian
NAVD	North American Vertical Datum
NCDC	National Climatic Data Center
NCS	nuclear criticality safety
ND	Nuclear Development
ND QAPD	Nuclear Development Quality Assurance Program document
N-DCIS	nonsafety-related distributed control and information system
NDCT	natural draft cooling tower
NDE	nondestructive examination
NDT	nil ductility temperature
NEDB	National Earthquake Database
NEHRP	National Earthquake Hazards Reduction Program
NEI	Nuclear Energy Institute
NEIC	National Earthquake Information Center
NERC	National Electric Reliability Council
NESC	National Electrical Safety Code
NFEMP	Nuclear Facilities Emergency Management Plan
NFPA	National Fire Protection Association
NGA	Next Generation Attenuation
NGVD	National Geodetic Vertical Datum
NIRMA	Nuclear Information and Records Management Association
NIST	National Institute of Standards and Technology
NMF	New Madrid fault
NMFS	New Madrid fault system
NMSZ	New Madrid Seismic Zone
NNE	north-northeast
NOAA	National Oceanic and Atmospheric Administration
NOC	Nuclear Operations Center
NOMMAD	Northwest Ohio and Michigan Mutual Aid District
NOV	notice of violation
NPHS	normal power heat sink
NQA	nuclear quality assurance
NRC	Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRO	Office of New Reactors
NS	nonseismic
NSAC	Nuclear Safety Analysis Center

$NTSP_F$	nominal trip setpoint (final)
NTTF	Near-Term Task Force
NUMARC	Nuclear Utilities Management and Resources Council
NVLAP	National Voluntary Laboratory Accreditation Program
NWS	National Weather Service
OBE	operating-basis earthquake
OCA	owner controlled area
OCANS	owner controlled area notification system
ODCM	offsite dose calculation manual
OE	Owner's Engineer
OEM	original equipment manufacturer
OGS	offgas system
OIS	oxygen injection system
OM	Operation and Maintenance Code
ORE	occupational radiation exposure
ORO	offsite response organization
OSC	operational support center
OTV	optical televiewer
P&ID	piping and instrumentation diagram
P/T	pressure/temperature
PA	protected area
PA/PL	plant announcement (page)/party-line
PAA	protective action area
PABX	private automatic branch exchange
PAG	Protective Action Guide
PAM	postaccident monitoring
PAR	protective action recommendation
PAS	post-accident sampling
PASS	post-accident sampling system
PAT	power ascension test
PBSRS	performance-based surface response spectra
PCC	passive containment cooling
PCCS	passive containment cooling system
PCP	process control program
PCTMS	plant cooling tower makeup system
PEER	Pacific Earthquake Engineering Research
PERMS	process effluent radiation monitoring and sampling
PEZ	Paleozoic Extended Zone
PGA	peak ground acceleration
PGD	peak ground displacement
PGP	procedures generation package
PGV	peak ground velocity
PIP	plant investment protection

PMCL	protective measures counterpart link
PMF	probable maximum flood
PMH	probable maximum hurricane
PMP	probable maximum precipitation
PMT	probable maximum tsunami
PMWP	probable maximum winter precipitation
PMWS	probable maximum windstorm
PO	Purchase Orders
PORV	power-operated relief valve
POV	power-operated valve
ppb	parts per billion
PPS	preferred power supply
PRA	probabilistic risk assessment
PRMS	process radiation monitoring system
P-S	compression (P) - shear (S)
PSD	power spectral density
psf	pounds per square-foot
PSHA	probabilistic seismic hazard analysis
PSI	preservice inspection
psi	pounds per square inch
psia	pounds per square-inch absolute
psig	pound per square inch gauge
PSP	Physical Security Plan
PSS	process sampling system
PST	preservice testing
PSWS	plant service water system
PTLR	pressure and temperature limits report
PTS	plant-specific technical specifications
PWS	potable water system
PWSS	pretreated water supply system
QA	quality assurance
QAP	quality assurance program
QAPD	quality assurance program description
Q-DCIS	safety-related distributed control and information system
RAI	request for additional information
RAP	reliability assurance program
RAS	River Analysis System
RAT	reserve auxiliary transformer
RB	reactor building
RCC	roller compacted concrete
RCCV	reinforced concrete containment vessel
RCCW	reactor closed-cooling water
RCCWS	reactor component cooling water system

R-COL	reference-COL
R-COLA	reference-COLA
RCPB	reactor coolant pressure boundary
RCS	reactor coolant system
RCTS	resonant column torsional shear
RE	reference earthquakes
rem	roentgen equivalent man (a unit of radiation dose)
REMP	radiological environmental monitoring program
REP	radiological emergency preparedness
RERP	radiological emergency response preparedness
RET	radiological emergency team
RFI	radio frequency interference
RG	regulatory guide
RIS	regulatory issue summary
RLME	repeated large magnitude earthquake
RM	resolution method
RMS	radiation monitoring system
RO	reverse osmosis
RP	radiation protection
RPP	Radiation Protection Program
RQD	rock quality designation
RR	Reelfoot Rift
RR-RCG	Reelfoot Rift-Rough Creek Graben
RSCL	reactor safety counterpart link
RSW	reactor shield wall
RT	radiographic testing (or technique)
RT_{NDT}	reference temperature nil ductility temperature
RTNSS	regulatory treatment of non-safety systems
RV	reactor vessel
RVSP	reactor vessel (materials) surveillance program
RVT	Random Vibration Theory
RWB	radwaste building
RWCU	reactor water cleanup
RWMS	radioactive waste management systems
s	second
SACTI	Seasonal/Annual Cooling Tower Impact
SAM	startup administrative manual
SAMSON	Solar and Meteorological Surface Observational Network
SAS	secondary alarm station
SASW	spectral analysis of surface wave
SAT	systems approach to training
SB	service building
SBO	station blackout
SBWR	simplified boiling-water reactor

SCC	stress corrosion cracking
SCOR	soil column outcrop response
SCP	Safeguards Contingency Plan
SCRRI	selected control rod run in
SDC	shutdown cooling
SDG	standby diesel generator
SDM	shutdown margin
SDMP	Steam Dryer Monitoring Plan
SDOF	single-degree-of-freedom
SE	safety evaluation
SEC	Securities and Exchange Commission
SER	safety evaluation report
SFP	spent fuel pool
SFPC	spent fuel pool cooling
SGI	safeguards information
SLC	standby liquid control
SLCS	standby liquid control system
SLR	St. Lawrence Rift
SM	subtraction method
SNM	Special Nuclear Material
SNMPPP	Special Nuclear Material Physical Protection Plan
SOG	Seismic Owners Group
SPDS	safety parameter display system
SPT	standard penetration test
SR	surveillance requirement
SRI	select rod insert
SRM	staff requirements memorandum
SRO	senior reactor operator
SRP	Standard Review Plan
SRV/SV	safety relief valve/safety valve
SSC	structure, system, and component
SSE	safe-shutdown earthquake
SSEMP	Safety, Security and Emergency Planning
SSEP	safety, security, and emergency preparedness
SSHAC	Senior Seismic Hazard Analysis Committee
SSI	soil-structure interaction
SSSI	structure-soil-structure interaction
SSW	south-southwest
Std	Standard
STS	standard technical specifications
SUNSI	Sensitive Unclassified Non-Safeguards Information
Sv	Sievert
SWDS	sanitary waste discharge system
SWMS	solid waste management system
SWS	station water system

SWST	station water storage tank
T&QP	Training and Qualification Plan
TAF	top of active fuel
TB	turbine building
TBS	turbine bypass system
TCCWS	turbine component cooling water system
TCP	traffic control point
TEDE	total effective dose equivalent
TG	Technical Guide
TGCS	turbine generator control system
TGSS	turbine gland seal system
THA	time-history accelerograph
TLD	thermoluminescent dosimeter
TMI	Three Mile Island
TMSS	turbine main steam system
TR	technical report
TS	technical specifications
TSC	technical support center
TSCR	truncated soil column response
TSCVS	technical support center heating, ventilation, and air conditioning subsystem
TSTF	Technical Specifications Task Force
UAT	unit auxiliary transformer
UB	upper-bound
UC	unconfined compression
UHF	ultra high frequency
UHRS	uniform hazard response spectra
UHS	ultimate heat sink
UPS	uninterruptible power supply
UR	upper-range
US	United States
USACE	U.S. Army Corps of Engineers
US-APWR	U.S. Advanced Pressurized Water Reactor
USCG	United Sates Coast Guard
USGS	United States Geological Survey
USI	unresolved safety issue
USNRC	United States Nuclear Regulatory Commission
UT	ultrasonic technique
UTM	Universal Transverse Mercator
V&V	verification and validation
V	volt
V/H	vertical-to-horizontal

Vac	volt alternating current
VBS	vehicle barrier system
Vdc	volt direct current
VHRA	very high radiation area
V_p	compression wave velocity
Vpc	volt per cell
V_s	shear wave velocity
WB	wet bulb
WBGT	wet bulb globe temperature
WNA	Western North America
WV	Wabash Valley
WVSZ	Wabash Valley Seismic Zone
ZIS	zinc injection system

10.0 STEAM AND POWER CONVERSION SYSTEM

This chapter introduces the principal design features, systems, and components of the steam and power conversion system. The components of this system are designed to produce electric power using the steam generated by the reactor; condense the steam into water; and return water to the reactor as heated feedwater with a major portion of its gaseous, dissolved, and particulate impurities removed to maintain reactor water quality.

The steam and power conversion system includes the turbine main steam system (TMSS), main turbine generator, main condenser, main condenser evacuation system, turbine gland seal system (TGSS), turbine bypass system (TBS), condensate purification system, condensate and feedwater system (C&FS), and circulating water system. The majority of the steam and power conversion system piping and components are located in the turbine building.

10.1 Summary Description

Section 10.1 of the Fermi 3 combined license (COL) Final Safety Analysis Report (FSAR), Revision 7, incorporates by reference Section 10.1 of the certified Economic Simplified Boiling-Water Reactor (ESBWR) Design Control Document (DCD), Revision 10, referenced in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix E, "Design Certification Rule for the Economic Simplified Boiling-Water Reactor," with no departures or supplements. The U.S. Nuclear Regulatory Commission (NRC) staff's finding related to information incorporated by reference is in NUREG-1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor Standard Design." NRC staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remains for review.[1] The NRC staff's review confirms that no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the summary description that were incorporated by reference are resolved.

10.2 Turbine Generator

10.2.1 Introduction

This FSAR section describes the turbine generator equipment design and design bases, including programs to ensure turbine rotor integrity to minimize potential impacts on safety-related structures, systems, and components (SSCs).

10.2.2 Summary of Application

Section 10.2 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.2 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 10.2, the applicant provides the following:

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

COL Items

- STD COL 10.2-1-A Turbine Maintenance and Inspection Program

The applicant addresses DCD COL Item 10.2-1-A in FSAR Subsections 10.2.2.4, 10.2.2.7, 10.2.3.6, and 10.2.3.7. In Subsection 10.2.3.6, the applicant states that the Turbine Maintenance and Inspection Program that supports the original equipment manufacturer's (OEM) turbine missile generation probability calculation is described in DCD Subsections 10.2.2.7, 10.2.3.5, 10.2.3.6, and in General Electric (GE) ST-56834/P, "ESBWR Steam Turbine – Low Pressure Rotor Missile Generation Probability Analysis," Revision 4. ST-56834/P, Revision 4 is a bounding missile probability calculation that contains the associated maintenance and inspection recommendations.

The applicant further addressed COL Item 10.2-1-A in FSAR Subsection 10.2.3.7. This subsection states that the inspection of all valves of one functional type or size will be conducted if a detrimental unusual condition is discovered during the inspection of any single valve. This subsection also states that the description of the Valve Inspection Program, including valve and control system maintenance, inspections, testing, and associated frequencies, is provided in ST-56834/P, Revision 4.

In FSAR Subsections 10.2.2.4 and 10.2.2.7, the applicant describes how the information in Subsections 10.2.3.6 and 10.2.3.7 applies to the turbine overspeed protection system and nonreturn valve inspection and testing.

- STD COL 10.2-2-A Turbine Missile Probability Analysis

In FSAR Subsection 10.2.3.8, the applicant provided information to address DCD COL Item 10.2-2-A. The applicant states that the probability of generating a turbine missile is based on bounding material property values in the ST-56834/P, Revision 4 report. Since the applicant relies on this report to address the COL items described above, the staff reviewed it as part of the technical evaluation of the Fermi 3 COL application.

Supplemental Information

- STD SUP 10.2-1 Turbine Design

In FSAR Subsection 10.2.3.4, the applicant identifies the turbine design model as N3R-6F52 from the GE nuclear steam turbine series.

10.2.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the turbine generator, and the associated acceptance criteria, are in Sections 10.2 and 10.2.3 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)" the Standard Review Plan (SRP).

The applicable regulatory requirements and associated guidance for the turbine generator are established in:

- General Design Criterion (GDC) 4, "Environmental and dynamic effects design bases," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," as it relates to SSCs important to safety being appropriately protected against the effects of missiles that may result from a turbine rotor failure

- Regulatory Guide (RG) 1.115, Revision 1, "Protection Against Low-Trajectory Turbine Missiles"

- NUREG–0800, Subsection 3.5.1.3 and Section 10.2.3

10.2.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 10.2 of the certified ESBWR DCD. The staff reviewed Section 10.2 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to the turbine generator.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

- STD COL 10.2-1-A Turbine Maintenance and Inspection Program

DCD COL 10.2-1-A requires the COL applicant to provide a description of the plant-specific Turbine Maintenance and Inspection Program required to satisfy the OEM's turbine missile generation probability calculation, including the acceptance criteria listed in Section II of SRP Subsection 3.5.1.3, and to address any valve and control system maintenance, inspections, and tests that are needed.

The applicant addresses COL Item STD COL 10.2-1-A in four FSAR Subsections: 10.2.2.4, "Turbine Overspeed Protection System"; 10.2.2.7, "Testing"; 10.2.3.6, "Inservice Maintenance and Inspection of Turbine Rotors"; and 10.2.3.7, "Inservice Inspection of Turbine Valves." These subsection numbers and titles correspond to subsections in the DCD.

Subsection 10.2.2.4 states that "inspection programs required by the turbine missile probability analysis and implementation of the inspection, maintenance, and testing programs discussed in Subsection 10.2.3.6 and Subsection 10.2.3.7 ensure operability." Subsection 10.2.2.7 states that "non-return valves are inspected and tested in accordance with vendor recommendations, as discussed in Subsection 10.2.3.7." The description of the valve inservice inspection requirement in Subsection 10.2.3.7 is consistent with the DCD, and it refers to the bounding missile probability analysis in the ST-56834/P, Revision 4 report for the valve and control system maintenance, inspections, testing, and associated frequencies. The staff confirmed that ST-56834/P, Revision 4, (Section 10.2) provides this information. The staff therefore found that

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

the portion of COL Item STD COL 10.2-1-A that is in FSAR Subsection 10.2.2.4 is acceptable. The staff's review of the turbine missile probability analysis in the ST-56834/P, Revision 4 report is discussed below under COL Item STD COL 10.2-2-A.

According to Acceptance Criterion 4 of SRP Subsection 3.5.1.3, an applicant obtaining the turbine from a manufacturer with an NRC-approved missile probability analysis is required to meet the probabilities listed in Table 3.5.1.3-1. This table includes the probability of a turbine failure resulting in the ejection of turbine rotor fragments through the turbine casing, P_1, of less than 10^{-4} per year for loading a favorably oriented turbine and bringing the system online. For the ESBWR, Section 10.2.1 of the DCD Tier 2 states that a more conservative P_1 value of less than 10^{-5} per year will be used if the recommended inspections and tests are conducted at the recommended frequencies. Acceptance Criterion 4 of SRP Subsection 3.5.1.3 also states that the turbine manufacturer should provide applicants with the relationship between the probability and the time that can be used to establish the inservice inspection and valve testing intervals that meet the missile probability criterion. Because the Fermi 3 applicant submitted a missile probability analysis from the manufacturer for NRC approval as part of the COL application, the inspection and valve testing intervals are also expected to be provided by the manufacturer. In FSAR Revision 3, Subsections 10.2.3.6 and 10.2.3.7, the applicant stated that this information is described in DCD Subsections 10.2.2.7, 10.2.3.5, and 10.2.3.6. The staff had previously reviewed these DCD subsections and determined that additional information (i.e., COL 10.2-1-A and 10.2-2-A) is required from a COL applicant.

The staff determined that by only listing DCD subsections as the basis for the inspection and maintenance program, the applicant was not providing new information from the manufacturer as required by the DCD COL Item 10.2-1-A, specifically, the turbine missile probability analysis recommended rotor dovetail inspection and extraction nonreturn valve testing that are not included in the DCD. Therefore, in Request for Additional Information (RAI) 10.02.03-19, the staff requested that the applicant include a requirement for these inspections in the COL FSAR. In the response to this RAI, dated October 28, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11305A214), the applicant proposed revising Subsection 10.2.3.6 of the FSAR as follows, with the revised portion identified by the underlined text:

> The turbine maintenance and inspection program that supports the Original Equipment Manufacturer's turbine missile generation probability calculation is described in DCD Subsections 10.2.2.7, 10.2.3.5, and 10.2.3.6, <u>and in GE-ST, "ESBWR Steam Turbine – Low Pressure Rotor Missile Generation Probability Analysis," ST-56834/P, Revision 4</u>.

The staff found this response acceptable because referencing the ST-56834/P, Revision 4 report provides additional maintenance and inspection information to supplement the DCD requirements. The staff's review of the ST-56834/P, Revision 4 report is discussed below under COL Item STD COL 10.2-2-A. This information thereby satisfies the OEM's missile probability calculation, as required by DCD COL Item 10.2-1-A. The staff confirmed that the applicant has included this change in Revision 4 of the COL FSAR. Therefore, this issue is resolved.

The staff reviewed the entire turbine missile probability analysis in the ST-56834/P, Revision 4 report, as discussed below under COL Item STD COL 10.2-2-A. The ST-56834/P report addresses the maintenance and inspection of rotors in Section 10.1 and the inspection of turbine valves in Section 10.2. Section 10.1 of the report is divided into Section 10.1.1,

"In-service Volumetric Rotor Inspections," and Section 10.1.2, "Rotor Dovetail Inspections" and includes the following types of inspections:

- visual, magnetic particle, and ultrasonic examination of all accessible surfaces of the rotors
- visual and magnetic particle or liquid penetrant examination of all turbine blades
- visual and magnetic particle examination of couplings and coupling bolts
- rotor dovetail inspections

The first three inspections are also listed in DCD Tier 2, Subsection 10.2.3.6. The description of the maintenance and inspection program in Section 10.1 of the ST-56834/P report is consistent with the DCD. In addition, for all of these inspections, the ST-56843/P report recommends an interval of no more than 12 years. This recommendation applies to the surfaces of both high-pressure and low-pressure rotors and rotor dovetails. The inspection interval and the rotor dovetail inspections are not identified in the DCD. Therefore, the staff reviewed this issue as new information provided by the applicant as part of COL Item STD COL 10.2-1-A.

For the rotors, the inservice inspections consist of visual, surface, and volumetric examinations, as described above. Section 10.1.1 of ST-56834/P also states that it is not possible to perform a volumetric examination of 100 percent of the rotor because of the outside surface geometry and features. The report states that this inspection is not essential for meeting the missile probability requirements because the growth of an internal flaw in the rotor body to the critical crack size is never the most probable missile generation mechanism. Because a 100 percent inservice volumetric examination is not possible, GE uses controls on rotor metallurgy, manufacturing, and preservice inspection to limit undetected flaws in the rotor. Section 3.1.3 of the ST-56834/P report describes preservice inspection and testing, which includes a 100 percent volumetric examination and a 100 percent surface examination (including the bore surface of bored rotors).

As discussed in the ST-56834/P report, the probability of a missile generation is dominated by turbine overspeed in the first 15 to 20 years of operation and by stress corrosion cracking (SCC) in an axial-entry dovetail slot bottom thereafter. Section 10.1.2 of the ST-56834/P report addresses the rotor dovetail inspections and recommends the following:

- magnetic particle surface examination of axial entry wheel dovetail faces
- ultrasonic examination of axial entry dovetail bottoms
- inspection of tangential entry dovetails (Stages 1 through 4) using a technique such as phased array ultrasonic examination
- engineering disposition of flaw indications (and possible removal of buckets for additional surface examination)
- the use of inservice inspection measurements to recalculate missile probability and determine subsequent inspection intervals, if necessary (e.g., if cracks are found)

The applicant's bounding missile probability analysis in the ST-56843/P Revision 4 report shows that the criterion of 10^{-5} annual missile generation probability is met for both bored and solid rotors for a period longer than the proposed 12-year inspection interval. Since the applicant's

proposed rotor inspection program, including the 12-year inspection interval, is consistent with the DCD and meets the missile probability requirement in SRP Subsection 3.5.1.3 for bounding materials properties, the staff found the program acceptable. This finding is based, in part, on the staff's detailed review of COL Item STD COL 10.2-2-A, the missile probability analysis.

Section 10.2 of the ST-56834/P report describes the recommended inservice inspection of valves. This section supplements the following statement in FSAR Subsection 10.2.3.7:

> Inspection of all valves of one functional type or size (i.e., stop, control, intercept, non-return) are conducted for any detrimental unusual condition (as defined by the turbine valve inspection program) if one is discovered during the inspection of any single valve.

In the response to RAI 10.02.03-19, the applicant also proposed a revision to FSAR Subsection 10.2.3.7 to address the valve testing requirements in STD COL 10.2-1-A as follows, showing additions (underlined) and deletions (strike-throughs):

> The turbine valve inspection program, including ~~Associated~~ valve and control system maintenance, inspections, testing, and associated frequencies, is described ~~and test frequencies are established in the bounding missile probability analysis~~ in GE-ST, "ESBWR Steam Turbine – Low Pressure Rotor Missile Generation Probability Analysis," ST-56834/P, Revision 4 ~~2, submitted in Reference 10.2-201~~.

In the same response, the applicant proposed deleting FSAR Section 10.2.6, "References," which contained ST-56834/P as the only entry, and correcting the revision number of ST-56834/P to Revision 4 in four places. The staff found these changes acceptable because Revision 4 of ST-56834/P is the latest revision reviewed by the staff, and FSAR Subsections 10.2.3.6 and 10.2.3.7 provide the reference information that makes Section 10.2.6 unnecessary. The staff confirmed that the applicant has included these changes in Revision 4 of the Fermi 3 COL FSAR. Therefore, this issue is resolved.

The staff found that the information in Section 10.2 of the COL FSAR describes the Turbine Maintenance and Inspection Program, which is required to satisfy the manufacturer's turbine missile generation probability calculation. This program is based on the information being consistent with the corresponding information in the DCD and meets the criteria in SRP Subsection 3.5.1.3 related to periodic inspection and testing. Therefore, the staff determined that COL Item STD COL 10.2-1-A is acceptable with respect to providing the valve testing requirements and frequencies. The staff also evaluated these requirements and frequencies as part of the review of COL Item STD COL 10.2-2-A, the missile probability analysis, which is described below.

- STD COL 10.2-2-A Turbine Missile Probability Analysis

DCD COL Item 10.2-2-A requires the COL applicant to provide an evaluation of the probability of a turbine missile generation using criteria in accordance with NRC requirements (based, if necessary, on bounding material property values until the actual material specimens are available).

The staff reviewed the applicant's information on COL Item STD COL10.2-2-A, which is related to providing the turbine missile probability analysis using the criteria and guidance in RG 1.115 and in SRP Subsection 3.5.1.3 and Section 10.2.3. In Revision 3 of the COL FSAR, the applicant addressed this COL Item by referencing a bounding analysis in ST-56834/P. Revision 2 of the FSAR referenced Revision 1 of ST-56834/P, dated July 2009. The staff's review of the turbine missile probability analysis included sequential requests for additional information, which resulted in corresponding changes to the missile analysis report and the FSAR (summarized in the following paragraph). This process culminated in Revision 4 of the FSAR referencing Revision 4 of ST-56834/P. The staff's review is described in detail below.

As a result of the responses to RAIs 10.02.03-1 through 10.02.03-11, dated October 5, 2010 (ADAMS Accession No. ML102800185); the responses to RAIs 10.02.03-12 through 10.02.03 16, dated July 29, 2011 (ADAMS Accession No. ML112140345); and the responses to RAIs 10.02.03-17 through 10.02.03-19, dated October 28, 2011 (ADAMS Accession No. ML113050573), the applicant submitted a revised turbine missile analysis, ST-56834/P, Revision 4, in a letter dated October 28, 2011 (ADAMS Accession No. ML11305A217 [public version]). The staff found that the revision to the analysis in ST-56834/P addresses the staff's concerns described below and is therefore acceptable. In addition, the staff noted that Revision 4 of the Fermi 3 COL FSAR was revised to reference the updated Revision 4 of ST-56834/P as the applicant's turbine missile probability analysis for the GE model number N3R-6F52 turbine generator. The staff finds this acceptable since the updated analysis was found to be acceptable as discussed below and is applicable to the Fermi 3 turbine generator.

ST-56834/P provides the analysis for the probability of generating missiles for the GE model number N3R-6F52 turbine generator specified by the COL applicant in Supplemental Information STD SUP 10.2-1. ST-56834/P, Revision 4 provides the methodology, assumptions, and results of the turbine missile generation probability, along with the manufacturer's recommendations for inservice testing and inspections. The methodology is consistent with the GE report entitled "Probability of Missile Generation in General Electric Nuclear Turbines," issued in January 1984, as approved by the NRC in NUREG-1048, "Safety Evaluation Report Related to the Operation of Hope Creek Generating Station," Supplement 6, Appendix U, "Probability of Missile Generation in General Electric Nuclear Turbines," issued in July 1986. ST-56834/P, Revision 4 also provides updated data, such as valve failure rates, to demonstrate that the destructive overspeed analysis is conservative. The methodology used consists of calculating the probability of turbine overspeed in conjunction with the probability of rotor burst and the probability of a turbine rotor fragment penetrating the turbine casing. The failure modes assumed in the analysis include a ductile burst (destructive overspeed), brittle fracture of a missed internal flaw growing to critical size due to cyclic fatigue, and SCC at the rotor dovetails.

The material used for the rotor forgings is a nickel-chromium-molybdenum-vanadium (NiCrMoV) alloy. The staff first reviewed the detailed material requirements in Revision 2 of ST-56834/P, which states in Section 3.1 that the rotor material will be produced in accordance with GE material specification B50A373B8. The staff determined that Revision 2 of ST-56834/P did

not provide enough detail about the material properties, including the chemistry, as required by the ESBWR DCD. In addition, Subsection 10.2.3.2.3 of NUREG–1966 states that the COL applicant will provide the material properties (e.g., sulfur and phosphorus content) as part of the turbine missile analysis. In the response to RAI 10.02.03-4, dated October 5, 2010, and the response to RAI 10.02.03-12, dated July 29, 2011, the applicant states that the rotors for the subject turbine use the GE material specification B50A373B8 or equivalent specification with more restrictive chemistry. The applicant points out that this material has been used since the 1980s for numerous integral (nonbored) rotors, with no rotor failures. The applicant also states in these responses that the geometry of the buckets has been modified since the 1980s to reduce the stresses, and the use of shot-peening applies compressive forces on the surfaces of the rotor to mitigate SCC.

However, the staff requested the applicant to provide the material specification for the staff's review to ensure that the material specification, including chemistry, is adequate to meet the guidance in SRP Section 10.2.3 concerning chemistry and processing to ensure adequate fracture toughness for the turbine rotor. The applicant's response to RAI 10.02.03-12, dated July 29, 2011, clarifies that the GE material specification B50A373B8 was revised to GE material specification B50A373B12. The only change in this Revision (from B8 to B12) was to restrict the nickel range required to achieve the desired material properties in nuclear nonbored monoblock rotor forgings. The staff conducted an audit of the GE material specification documented in an NRC memorandum dated September 26, 2011 (ADAMS Accession No. ML112640028). The audit confirmed that the material has been used since the 1980s for turbine rotors and was only revised to restrict the nickel range. The staff also confirmed that the material is a vacuum-treated NiCrMoV alloy with the amounts of alloying impurity elements in the range of typical modern nuclear turbines, which is consistent with Subsection 10.2.3.1 of the ESBWR DCD and SRP Section 10.2.3. Therefore, the staff found that the material composition included in Revision 4 of ST-56834/P is acceptable and will be used for the procurement of the Fermi 3 turbine rotor.

Concerning the use of the bounding material properties, the applicant's response to RAI 10.02.03-17, dated October 28, 2011, states that Revision 4 of ST-56834/P was updated to include the bounding assumption of the minimum tensile strength in the material specification. The bounding fracture appearance transition temperature (FATT) value of -1.1 degrees Celsius (C) (+30 degrees Fahrenheit (F)) described in the ESBWR DCD and the applicable GE material specification B50A373B12 were also used in Revision 4 of the analysis, as discussed in the July 29, 2011, response to RAI 10.02.03-13. As stated in the response to RAI 10.02.03-5, dated October 5, 2010, this FATT value of -1.1 degrees C (+30 degrees F) will be determined on the site-specific rotor forgings using a deep-seated impact specimens machined from radial trepans between the rotor wheels to ensure that the specified FATT value in the internal rotor region is met. In addition, the responses to RAI 10.02.03-6 and 10.02.03-7, dated October 5, 2010, show that 11 nuclear turbine rotor forgings in the past 20 years were tested, and the corresponding FATT values were well below +30 degrees F (-1.1 degrees C) throughout the rotor forgings. Statistically, the forging data resulted in a mean FATT value of -36.7 degrees C (-34 degrees F), with a plus two-sigma value of -12 degrees C (+11 degrees F), which demonstrates that these large monoblock forgings can achieve the required FATT value of -1.1 degrees C (+30 degrees F). Therefore, the staff found that the bounding material properties of the turbine rotor were used in the analysis.

In addition, in the response to RAI 10.02.03-18, dated October 28, 2011, the applicant clarified that the analysis used design overspeed stresses based on the postulated conditions and

events in Section 7 of ST-56834/P. The design overspeed was clarified to be 120 percent of rated speed in the October 5, 2010, response to RAI 10.02.03-3, which is consistent with the ESBWR design overspeed. In the July 29, 2011, response to RAI 10.02.03-15, the applicant states that the tangential stresses at the slot bottoms of the axial entry dovetails are lower than the previous shrunk-on-wheel keyways, and therefore, the use of the shrunk-on-wheel crack initiation and growth characteristics is conservative. Also, this response provides information that shot-peening the rotor imparts compressive stresses to remove tensile residual stresses on the surface, thereby reducing the occurrence of SCC. Therefore, based on the above information, the staff found that the analysis used conservative and appropriate stresses in the turbine rotor.

Cyclic propagation of an assumed internal forging defect due to tangential stresses from mechanical and thermal loading was performed in the analysis. As stated in the response to RAI 10.02.03-18, dated October 28, 2011, the loading was determined based on both normal and abnormal turbine speed, with assumed annual cyclic loading due to starts, stops, and load swings of the turbine. These stresses were derived using finite element analysis based on the geometry for the N3R-6F52 rotor using corresponding startup transient thermal loadings, as clarified in the applicant's October 5, 2010, response to RAI 10.02.03-9.

The report includes an analysis of a rupture of the turbine rotor due to SCC in the slot bottoms of the rotor dovetails for the axial entry dovetails. The crack growth rate of shrunk-on-wheel keyways was used as a conservative basis, due to the higher stresses at these keyways from past operating experience when compared to the current monoblock forgings. The tangential stress of the dovetail slots in the monoblock forgings are much less than in the previous shrunk-on-wheel keyways, as illustrated in the October 5, 2010, response to RAI 10.02.03-10. Also, shot-peening of the turbine rotor surfaces reduces residual stresses and adds compressive stresses to mitigate the occurrence of SCC, as discussed in the July 29, 2011, response to RAI 10.02.03-15. The analysis demonstrated that the critical crack size in the dovetail slots would be reached in approximately 40 years and that the crack size is well within the nondestructive inspection capabilities, as discussed in the July 29, 2011, response to RAI 10.02.03-13.

The ductile tensile burst of the rotor was analyzed using the average tangential stress of each rotor stage and the corresponding tensile strength of the material. The minimum ultimate tensile strength of the material specification was used so the analysis would be bounding.

These three failure modes—cyclic fatigue, SSC, and ductile tensile burst—were used to calculate the probability of rupturing the rotor and were then combined to achieve a single probability of rupturing a turbine rotor. This was conducted for various scenarios and turbine speeds, and these probabilities of rupturing a rotor, combined with the probability of the ruptured rotor fragment penetrating the turbine casing, resulted in a final probability of generating a turbine missile. Figures 9-1 and 9-2 of ST-56834/P present the result of the annual probability of generating a turbine missile.

These annual probability results in Figures 9-1 and 9-2 of ST-56834/P demonstrate that the probability of generating turbine missiles is less than 10^{-5} for an inspection interval greater than 12 years. Therefore, the proposed inspection interval of 12 years, as stated in Section 10.1 of ST-56834/P, Revision 4, meets the criteria in RG 1.115. Section 10.1 of ST-56834/P, Revision 4 also provides the turbine manufacturer's recommendations for the inspection and maintenance program description of the turbine rotors, which includes the following:

- visual, magnetic particle, and ultrasonic examination of all accessible rotor surfaces
- visual and magnetic particle or liquid penetrant examination of all turbine blades
- visual and magnetic particle examination of couplings and coupling bolts

These inspection methods are consistent with ESBWR DCD, Subsection 10.2.3.6. As clarified in the response to RAI 10.02.03-19, dated October 28, 2011, the turbine manufacturer also recommends that rotor dovetail inspections detailed in Section 10.1.2 of ST-56834/P, Revision 4 be performed within a 12-year interval because in Section 9 of ST-56834/P, Revision 4, GE determined that SCC in dovetail slot bottoms controls the probability of generating a turbine missile after 20 years of operation. The staff found that the proposed description of the inspection program and inspection interval of 12 years is acceptable because it meets the criteria of RG 1.115 and is consistent with the guidelines of SRP Section 10.2.3: to ensure that the turbine rotor integrity is maintained to preclude the generation of a missile.

As clarified by the applicant's response to RAI 10.02.03-2, dated October 5, 2010, a MARK VIe turbine generator control system (TGCS) is used for the ESBWR turbine generator at Fermi 3. This TGCS has the same functional design and component requirements of previous GE turbine generators, with improvements made based on operating experience. Some of the improvements that are detailed in the response to RAI 10.02.03-11, dated October 5, 2010, include the use of direct mechanical connections to the valve stem to reduce the number of moving parts and eliminate potential linkage binding on the control and intercept steam valves. These direct linkages have also been used in current operating plants on the main stop valve and intercept stop valves. In addition, this RAI response includes the steam valve failure rates based on failure assessment data reports collected in 1993 and 2008 and were used in ST-56834/P for the main stop and control valves and the intermediate stop and intercept valves. As stated in the response to RAI 10.02.03-16, dated July 29, 2011, the improvements made after 1984 were effective in reducing the probability of failures. The failure rates are listed in Section 5 of ST-56834/P, Revision 4.

Section 5.4.1 of ST-56834/P, Revision 4, provides the hydraulic system reliability model based on the following common failure modes: water contamination caused by leaking oil coolers and corrosion of non-stainless steel mechanical and/or electrical hydraulic trip valves. After 1984, GE made improvements to the designs and materials in current operating plants, such as using titanium hydraulic oil coolers and new hydraulic fluid conditioning equipment that resolved these common failure modes. However, the analysis used the pre-1984 hydraulic failure rate model as a conservative assumption, which bounds the improved hydraulic system proposed for the ESBWR turbine. The overspeed probability from valve failures was performed for valve test intervals of 90 and 120 days, resulting in similar annual missile probabilities, which were provided in the July 29, 2011, response to RAI 10.02.03-16. The overspeed probability for a valve test interval of 120 days was well within the criteria of 10^{-5} per year specified in RG 1.115 and the guidance in SRP Subsection 3.5.1.3. Therefore, the staff found the 120-day test interval acceptable because it meets the annual missile probability criteria of 10^{-5} per year in RG 1.115 and the specified guidelines in SRP Subsection 3.5.1.3 and Section 10.2.3 to ensure that the turbine rotor integrity is maintained to preclude the generation of missiles.

Based on the above discussion, the staff found the applicant's referenced turbine missile probability analysis, ST-56834/P, Revision 4, provides an acceptable analysis that substantiates the turbine manufacturer's recommendations for inspecting and testing the turbine rotor and associated valves using the criteria in RG 1.115. In addition, the applicant's description of the turbine maintenance and inspection program, which includes the turbine manufacturer's

recommendations for inspecting and testing the turbine rotor and associated valves, is consistent with the guidance in SRP Section 10.2.3 and Section 10.2.3 of the ESBWR DCD. Therefore, the staff determined that the applicant has adequately addressed COL Item STD COL 10.2-2-A.

With respect to the review of COL Items STD COL 10.2-1-A and STD COL 10.2-2-A, the staff determined that RAIs 10.02.03-1 through 10.02.03-19 are resolved.

Supplemental Information:

- STD SUP 10.2-1 Turbine Design

In FSAR Subsection 10.2.3.4, the applicant states that GE will manufacture the turbine and generator for the Fermi 3 site. The applicant selected the N3R-6F52 turbine model, which is one of GE's N series nuclear steam turbines. The staff found this turbine design model acceptable because GE has provided an acceptable turbine missile analysis for this model, as discussed above in the evaluation of STD COL 10.2-2-A.

10.2.5 Post Combined License Activities

There are no post COL activities related to this section.

10.2.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information relating to the turbine generator, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the turbine generator that were incorporated by reference are resolved.

In addition, the staff compared the supplemental information in the COL application to the relevant NRC regulations, the guidance in Sections 10.2 and 10.2.3 of NUREG–0800, and other NRC RGs. The staff's review concludes that the information in this section of the COL FSAR is acceptable and meets the requirements of GDC 4. The staff evaluated COL Items STD COL 10.2-1-A and STD COL 10.2-2-A according to the relevant NRC regulations and acceptance criteria in Section 10.2.3 and Subsection 3.5.1.3 of NUREG–0800. The staff finds that the applicant has satisfactorily addressed DCD COL Item 10.2-1-A because the proposed maintenance and inspection program is consistent with the corresponding information in the DCD and meets the criteria in SRP Subsection 3.5.1.3 related to periodic inspection and testing. The staff also finds that the applicant has satisfactorily addressed DCD COL Item 10.2-2-A because the turbine missile probability analysis, ST-56834/P, Revision 4, provides the turbine manufacturer's recommendations for inspecting and testing the turbine rotor and associated valves using the criteria in RG 1.115. Additionally, the staff reviewed Supplemental Information STD SUP 10.2-1, which provides the turbine model number. The staff finds this supplemental information acceptable because the applicant has provided an acceptable turbine missile analysis for this turbine model, as discussed in the evaluation of COL Item STD COL 10.2-2-A.

10.3 Turbine Main Steam Supply System

Section 10.3 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.3 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E, with no departures or supplements. NRC staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remains for review.[1] The NRC staff's review confirms that no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the turbine main steam supply system that were incorporated by reference are resolved.

10.4 Other Features of Steam and Power Conversion System

This FSAR section describes other features of the steam and power conversion system:

- Section 10.4.1: The main condenser system functions as the steam cycle heat sink in receiving, condensing, and deaerating steam from the main turbine and other vents and drains in the steam cycle system.

- Section 10.4.2: The main condenser evacuation system establishes and maintains the main steam condenser vacuum and removes non-condensable gases and air from the main condenser.

- Section 10.4.3: The turbine gland seal system prevents air leakage into and steam out of the annulus space between the turbine and steam valve shafts.

- Section 10.4.4: The turbine bypass system enables a system to allow some main steam flow directly to the main condensers, thus bypassing the turbine.

- Section 10.4.5: The circulating water system (CWS) provides a continuous supply of cooling water to the main condenser.

- Section 10.4.6: The condensate purification system (CPS) purifies the condensate and minimizes corrosion/erosion products in the power conversion cycle.

- Section 10.4.7: The condensate and feedwater system (C&FS) supplies high-purity feedwater to the reactor at the required flow rate, pressure, and temperature.

- Section 10.4.8: The steam generator blowdown system for pressurized-water reactors (PWRs) is not applicable to the ESBWR design.

- Section 10.4.9: The auxiliary feedwater system for PWRs is not applicable to the ESBWR design.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

10.4.1 Main Condenser

Section 10.4.1 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.4.1 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E, with no departures or supplements. NRC staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remains for review.[1] The NRC staff's review confirms that no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the main condenser that were incorporated by reference are resolved.

10.4.2 Main Condenser Evacuation System

Section 10.4.2 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.4.2 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E, with no departures or supplements. NRC staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remains for review.[1] The NRC staff's review confirms that no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the main condenser evacuation system that were incorporated by reference are resolved.

10.4.3 Turbine Gland Seal System

Section 10.4.3 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.4.3 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E, with no departures or supplements. NRC staff reviewed the application and checked the referenced DCD to ensure that no issue related to this section remains for review.[1] The NRC staff's review confirms that no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the turbine gland seal system that were incorporated by reference are resolved.

10.4.4 Turbine Bypass System

Section 10.4.4 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.4.4 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E, with no departures or supplements. NRC staff reviewed the application and checked the referenced DCD to ensure that no issue related to this section remains for review.[1] The NRC staff's review confirms that no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the turbine bypass system that were incorporated by reference are resolved.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

10.4.5 Circulating Water System

10.4.5.1 *Introduction*

The CWS provides cooling water for the removal of the power cycle heat from the main condensers and transfers this heat to the normal power heat sink.

10.4.5.2 *Summary of Application*

Section 10.4.5 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.4.5 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 10.4.5, the applicant provides the following conceptual design information (CDI):

Site-Specific Information Replacing Conceptual Design Information

The applicant replaces the CDI in the DCD with a detailed description of the site-specific system for Fermi 3 as follows:

- EF3 CDI — FSAR Subsection 10.4.5.2.1, "General Description"

The applicant describes the CWS by replacing the design information in the DCD with a more detailed general description of the site-specific system proposed for Fermi 3.

- EF3 CDI — FSAR Subsection 10.4.5.2.2, "Component Description"

In FSAR Table 10.4-3R, the applicant provides site-specific parameters to replace the values in ESBWR DCD, Table 10.4-3, "Circulating Water System."

- EF3 CDI — FSAR Subsection 10.4.5.2.2.1, "CIRC Chemical Injection"

In FSAR Subsection 10.4.5.2.2.1, the applicant provides information on the CWS chemical injection system and water chemistry that is not included in the DCD.

- EF3 CDI — FSAR Subsection 10.4.5.2.3, "System Operation"

In FSAR Subsection 10.4.5.2.3, the applicant provides supplemental information describing the Fermi 3 site-specific CWS operation.

- EF3 CDI — FSAR Subsection 10.4.5.5, "Instrumentation Applications"

In FSAR Subsection 10.4.5.5, the applicant provides instrumentation and test practices in addition to those in the ESBWR DCD, Revision 10.

- EF3 CDI — FSAR Subsections 10.4.5.6, "Flood Protection," and 10.4.5.8, "Normal Power Heat Sink"

In FSAR Subsections 10.4.5.6 and 10.4.5.8, the applicant describes the Fermi 3 site-specific cooling tower failure analysis related to flood protection and the normal power heat sink, which is a hyperbolic natural draft cooling tower (NDCT).

10.4.5.3 *Regulatory Basis*

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the CWS, and the associated acceptance criteria, are in Section 10.4.5 of NUREG–0800.

The applicable regulatory requirement and associated guidance for the CWS are as follows:

- GDC 4, as it relates to design provisions provided to accommodate the effects of discharging water that may result from a failure of a component or piping in the CWS

10.4.5.4 *Technical Evaluation*

As documented in NUREG–1966, NRC staff reviewed and approved Section 10.4.5 of the certified ESBWR DCD. The staff reviewed Section 10.4.5 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to the CWS.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

Site-Specific Information Replacing Conceptual Design Information:

- EF3 CDI — FSAR Subsection 10.4.5.2.1, "General Description"

In FSAR Subsection 10.4.5.2.1, the applicant provides supplemental information that replaces the design information in the DCD with a more detailed general description of the site-specific CWS proposed for Fermi 3. The supplemental information includes the design and arrangement of the CWS, which consists of (a) one hyperbolic NDCT; (b) four 25-percent capacity circulating water pumps; (c) condenser water boxes; (d) related piping and valves; (e) the water box drain subsystem; and (f) condenser tube cleaning equipment. The system configuration for the Fermi 3 CWS is depicted in FSAR Figures 10.4-201 and 10.4-202, which replace the conceptual diagram in Figure 10.4-1 of the DCD. The staff reviewed the design information in FSAR Subsection 10.4.5.2.1 and found that the applicant has addressed the final configuration of the Fermi 3 CWS, as specified in Subsection 10.4.5.2.1 of the ESBWR DCD, Revision 10. Also, the staff found that the configuration and piping and valve arrangement of the CWS are in agreement with the conceptual design—as recommended in the DCD—and are therefore acceptable.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

Furthermore, the CWS design includes vents to help fill in and remove air and other non-condensable gases from the condenser water boxes during startup and normal operations. The system includes design features such as the slow-stroke, motor-operated valves; air- and vacuum-release valves; control and interlock features that ensure the proper valve lineup before pump startup; and discharge isolation valves that open and close with pump start and stop signals. These provisions will minimize pressure transients during startup and normal operations of the system. The staff found that these vents, air releases, and vacuum-relief valve provisions in the CWS adequately address the requirements of GDC 4 as it relates to design features that accommodate the effects of discharging water and prevent water hammer and subsequent CWS piping or component failures from occurring at pump startup due to initial system pressurization.

- EF3 CDI — FSAR Subsection 10.4.5.2.2, "Component Description"

In FSAR Table 10.4-3R, the applicant provides site-specific parameters to replace the values in ESBWR DCD, Table 10.4-3. The staff found that the operating temperatures and circulating water pump information in FSAR Table 10.4-3R are acceptable because they are bounded by the values in the ESBWR DCD.

- EF3 CDI — FSAR Subsection 10.4.5.2.2.1, "CIRC (CWS) Chemical Injection"

FSAR Subsection 10.4.5.2.2.1 provides information on the CWS chemical injection system and water chemistry that is not included in the ESBWR DCD. The proposed chemical injection maintains a noncorrosive, non-scale-forming condition. This condition ensures that biological film growth that may affect the condenser heat transfer rate does not occur. This section also provides the chemicals used, as specified by plant chemistry, to control the circulating water chemistry. In addition, the section states that the selected chemicals are compatible with the selected materials or components used in the CWS.

The staff reviewed the information in the FSAR and found that the applicant has adequately identified the chemicals to be used for chemical treatment of the CWS materials. The applicant also specifies the criteria that will ensure compatibility with the system materials. Furthermore, the identified chemicals will perform the appropriate functions to minimize the fouling of heat transfer surfaces and the corrosion of the CWS. Although there are no specific regulatory criteria for the CWS materials and chemistry, the use of materials that are corrosion-resistant in the environment and water treatment chemicals that are compatible with system materials ensures that corrosion and biological film growth will not affect the condenser heat transfer rate.

- EF3 CDI — FSAR Subsection 10.4.5.2.3, "System Operation"

In FSAR Subsection 10.4.5.2.3, the applicant provides supplemental information describing the Fermi 3 site-specific CWS operation that is not included in the ESBWR DCD. The applicant states that leakage from the main condenser into the CWS through a condenser tube leak is not likely to occur during power operation because the CWS normally operates at a greater pressure than the shell (condensate) side of the condenser. This pressure difference prevents radioactive releases into the circulating water, and the staff therefore found the applicant's supplemental information describing the CWS operation acceptable.

Furthermore, the applicant states that the analysis of routine cooling tower grab samples will detect events that could lead to unmonitored and uncontrolled radioactive releases into the environment. The applicant adds that this action satisfies the requirements of Inspection and Enforcement (IE) Bulletin (BL) No. 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment." Consistent with BL 80-10, FSAR Sections 11.2, "Liquid Waste Management Systems," and 11.4, "Solid Waste Management Systems," address the issue of preventing and monitoring for cross-contamination of systems not normally radioactive that could become contaminated through interactions with the operating conditions in radioactive systems. Sections 11.2 and 11.4 of this SER provide the staff's evaluation of this issue.

- EF3 CDI — FSAR Subsection 10.4.5.5, "Instrumentation Applications"

The applicant provides the following instrumentation and test practices in addition to those in the ESBWR DCD, Revision 10:

a. Level instrumentation in the circulating water pump pit to control makeup flow from the station water system to the NDCT basin, including alarms in the main control room for an abnormally low or high water level

b. Pressure indications on the CWS pump discharge and differential pressure instrumentation across the inlet and outlet to the condenser to determine the frequency of operating the condenser tube-cleaning system

c. Local grab samples used to periodically test the circulating water quality

The staff found these additional new instrumentation and test practices acceptable because they enhance the design and operational capability of the CWS.

- EF3 CDI — FSAR Subsection 10.4.5.6, "Flood Protection," and Subsection 10.4.5.8, "Normal Power Heat Sink"

In FSAR Subsection 10.4.5.8, the applicant describes the Fermi 3 site-specific normal power heat sink, which consists of one NDCT. The applicant states that the NDCT will be located at least a distance equal to its height away from Seismic Category 1 and 2 structures. Therefore, there is no potential for the cooling tower to fall and damage safety-related structures or components. Furthermore, the NDCT is made from noncombustible materials.

The staff reviewed the applicant's information and could not find additional details on the location of the NDCT. The staff also could not find any design features to prevent flooding or control the effects from a flood in case a cooling tower failed on nearby safety-related areas or near the safety-related SSCs, as they relate to the requirements of GDC 4. In addition, there was no information in the FSAR with respect to Subsection 10.4.5.6, "Flood Protection," of the ESBWR DCD, Revision 9. In accordance with SRP Section 10.4.5, "Circulating Water System," Acceptance Criterion Item 1, design provisions need to be provided to accommodate the effects of discharging water that may result from a failure of a component or piping in the CWS. Therefore, in RAI 10.04.05-1, the staff requested the applicant to provide additional information about (1) the cooling tower failure analysis; (2) provisions incorporated into the Fermi 3 CWS design to prevent the unacceptable flooding of areas containing safety-related equipment; or (3) provisions incorporated into the Fermi 3 CWS design to mitigate the consequences of flooding.

The applicant's response to RAI 10.04.05-1, dated January 29, 2010 (ADAMS Accession No. ML100331450), refers to a response that was included as part of the response to RAI 02.04.02-3, dated November 20, 2009 (ADAMS Accession No. ML093280179). In that response, the applicant states that the failure of a pipe or component in the NDCT or elsewhere in the CWS would not have an adverse impact on the design functions of safety-related SSCs. The applicant also states that the largest components in the NDCT are the CWS discharge piping. The four CWS pumps are arranged in parallel, and the discharge lines combine into two parallel main circulating water supply lines to the main condenser. A pipe break in the combined line would be a limiting pipe break scenario. For the most part, the CWS pipes are routed below grade. A postulated rupture of one of the CWS pipes above grade would result in water flowing into the area of the yard near the NDCT. However, the NDCT is located at an elevation lower than the power block area where Category I structures are located. Also, in Revision 2 of the FSAR, the applicant provided supplemental information in Subsection 10.4.5.6 to reflect the above response, in which the applicant states that the grade elevation where Category I structures are located will be more than 2.1 meters (7 feet) above the current elevation. The NDCT is not located in the area that is being elevated. Therefore, the applicant states that the water discharged from the postulated break in the CWS line above grade will flow away from the power block. Furthermore, FSAR Figures 2.1-204 and 2.4-215 provide the relative location of the NDCT with respect to the power block structure and the extent of the area that will be elevated.

In addition, the applicant states in the RAI response that the pipe failures above ground bound other piping and component failures in the CWS because the underground and smaller-diameter components will have lower flow rates than in a postulated failure of the above-ground, large-bore CWS pipe. The discharge water from such a failure will flow away from any safety-related structures and will not cause any flooding to these structures. Also, the applicant considers a failure of the NDCT basin and states that such a failure will have no effect on safety-related structures because the NDCT is lower than the grade elevation of the power block, and the basin water level elevation is lower than the levels in the surrounding areas.

Based on the above discussions, the staff found that the applicant's response to RAI 10.04.05-1 is acceptable because it provides design provisions to accommodate the effects of discharging water that may result from a failure of a component or piping in the CWS. Therefore, this RAI 10.04.05-1 is closed. In addition, the staff found that the conclusions in NUREG–1966 regarding the requirements of GDC 4, with respect to the effects of discharging water that may result from the failure of a component or piping in the CWS, remain valid.

10.4.5.5 *Post Combined Operating License Activities*

There are no post COL activities related to this section.

10.4.5.6 *Conclusion*

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information relating to the CWS, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the CWS that were incorporated by reference are resolved.

In addition, the staff compared the supplemental information in the COL application to the relevant NRC regulations, the guidance in Section 10.4.5 of NUREG–0800, and other NRC RGs. The staff's review concludes that the site-specific CDI for the CWS in this section of the Fermi 3 COL FSAR is acceptable and does not change the conclusions of NUREG–1966. The staff found that the EF3 CDI for the CWS meets the relevant NRC regulations and acceptance criteria defined in NUREG–0800, Section 10.4.5. The staff also concludes that the information presented for the EF3 CDI is acceptable and meets the requirements of GDC 4.

10.4.6 Condensate Purification System

10.4.6.1 *Introduction*

This FSAR section addresses the CPS, which includes information related to the purification and treatment of the condensate that is required to maintain reactor feedwater purity. The CPS uses filtration to remove suspended solids, including corrosion products. The CPS uses ion exchange to remove dissolved solids and other impurities.

10.4.6.2 *Summary of Application*

Section 10.4.6 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.4.6 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 10.4.6, the applicant provides the following:

COL Item

- STD COL 10.4-1-A Leakage (of Circulating Water Into the Condenser)

In FSAR Subsection 10.4.6.3, the applicant adds information about the chemistry parameters in the CPS to address COL Item STD COL 10.4-1-A. The applicant provides FSAR Table 10.4-201, which summarizes the manufacturer's recommended threshold values of the chemistry parameters and the associated operator actions.

Supplemental Information

- EF3 SUP 10.4-1

In FSAR Subsection 10.4.6.2, the applicant provides plant-specific supplemental information that adds a sentence stating that the CPS condensate filters and demineralizers are capable of accommodating 100 percent of the feedwater flow.

10.4.6.3 *Regulatory Basis*

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the CPS, and the associated acceptance criteria, are in Section 10.4.6 of NUREG–0800.

The applicable regulatory requirements and associated guidance for the CPS are as follows:

- GDC 14, "Reactor coolant pressure boundary," as it relates to the reactor coolant pressure boundary being designed, fabricated, erected, and tested, so as to have an extremely low probability of an abnormal leakage; a rapidly propagating failure; and a gross rupture

- Electric Power Research Institute (EPRI) Report NP-4947-SR, "BWR Hydrogen Water Chemistry Guidelines," 1987 Revision

10.4.6.4 *Technical Evaluation*

As documented in NUREG–1966, NRC staff reviewed and approved Section 10.4.6 of the certified ESBWR DCD. The staff reviewed Section 10.4.6 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to the CPS.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Item:

- STD COL 10.4-1-A Leakage (of Circulating Water Into the Condenser)

The applicant provides FSAR Table 10.4-201, which summarizes the manufacturer's recommended threshold values of the chemistry parameters and the associated operator actions. These parameters enable the operation of the system within the EPRI Boiling-Water Reactor (BWR) hydrogen water chemistry guidelines. The staff found the applicant's information addressing COL Item STD COL 10.4-1-A acceptable because the chemistry parameters meet the recommendations of SRP Section 10.4.6, the EPRI BWR water chemistry guidelines, and the requirements of GDC 14.

Supplemental Information

- EF3 SUP 10.4-1

The applicant adds a sentence stating that the CPS condensate filters and demineralizers are capable of accommodating 100 percent of the feedwater flow. The staff found this statement acceptable because this design feature gives the system the capabilities to operate in a cascading configuration, while accommodating 100 percent of the feedwater flow.

10.4.6.5 *Post Combined License Activities*

There are no post COL activities related to this section.

10.4.6.6 *Conclusion*

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information relating to the CPS, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the CPS that were incorporated by reference are resolved.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in Section 10.4.6 of NUREG–0800, and other NRC RGs and industry standards. The staff's review concludes that the information in this section of the Fermi 3 COLA FSAR is acceptable and meets the requirements of GDC 14 and the NRC-endorsed EPRI guidelines for BWR hydrogen water chemistry. The staff evaluated COL Item STD COL 10.4-1-A and Supplemental Information EF3 SUP 10.4-1 in this section and finds that the applicant has satisfactorily addressed these items.

10.4.7 Condensate and Feedwater System

10.4.7.1 *Introduction*

This FSAR section addresses the C&FS, which receives condensate from the condenser hotwell; supplies condensate to the CPS; and delivers high-purity feedwater to the reactor at the required flow rate, pressure, and temperature. The C&FS does not serve or support any safety function and has no safety design basis. A failure of this system will not compromise any safety-related system or prevent a safe shutdown.

10.4.7.2 *Summary of Application*

Section 10.4.7 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 10.4.7 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 10.4.7, the applicant provides the following:

Supplemental Information

- EF3 SUP 10.4-2

The applicant provides supplemental information stating that the C&FS components can accommodate 100 percent feedwater flow to support a cascading feedwater configuration.

10.4.7.3 *Regulatory Basis*

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the C&FS, and the associated acceptance criteria, are in Section 10.4.7 of NUREG–0800.

10.4.7.4 *Technical Evaluation*

As documented in NUREG–1966, NRC staff reviewed and approved Section 10.4.7 of the certified ESBWR DCD. The staff reviewed Section 10.4.7 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to the C&FS.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

Supplemental Information

- EF3 SUP 10.4-2

The Fermi 3 COL FSAR, Revision 3, Section 10.4.7 did not include any departures, COL items, supplemental information, or standard content. However, in the response to RAI 12.02-7, dated August 5, 2011 (ADAMS Accession No. ML11221A075), the applicant proposed to add new supplemental information in FSAR Subsection 10.4.7.2.1 by adding the following sentence: "The C&FS components can accommodate 100 percent feedwater flow to support a cascading feedwater configuration."

The staff reviewed the proposed change to FSAR Subsection 10.4.7.2.1. The staff found that in the ESBWR DCD, the steam and power conversion system design and the balance of plant (BOP) heat balance were based on the C&FS operating in a pumped-forward configuration. While the staff's review of the DCD information did indicate that the C&FS is capable of being configured to operate in a cascading configuration, the staff found that the DCD does not discuss the operation of the system in the cascading mode, nor does the DCD directly identify a system configuration for routing 100 percent of the feedwater flow through the CPS, as stated in the proposed supplemental information to be added to the Fermi 3 COL FSAR. Therefore, the staff issued RAI 10.04.07-1 requesting the applicant to clarify whether the proposed change to the COL FSAR constitutes a departure. The RAI also asked the applicant to provide appropriate justification for the applicant's determination on the classification of the added information, along with supporting information to specify how operating in the cascading mode is bounded by the relevant evaluation included in the ESBWR DCD.

The applicant's response to RAI 10.04.07-1, in a letter dated December 14, 2011 (ADAMS Accession No. ML11350A200), indicates that the information added to the COL FSAR pertaining to the operation of the C&FS in a cascading configuration does not represent a deviation from the design information in the DCD; it is therefore not considered a departure. In support of that determination, the applicant provides the following:

- The supplemental information added to Chapter 10 of the FSAR ensures sufficient capacity in the C&FS and CPS to allow full feedwater flow to pass through the CPS.
- The ESBWR feedwater heater drain systems are normally operated in a pumped forward configuration. The Fermi 3 FSAR does not modify the ESBWR DCD description of normal plant operation; i.e., Detroit Edison intends to operate Fermi 3, as described in the DCD, in a pumped forward configuration.
- The ESBWR DCD safety analyses and anticipated operational occurrences analyses are not impacted by operation in the cascade configuration because feedwater temperature must be maintained within the feedwater temperature operating domain. If necessary, Feedwater Heater No. 7 can be placed into service to ensure that feedwater system temperature is maintained within the operating domain.
- When operating in a cascade configuration, feedwater heaters will remain in service. Feedwater flow will continue to be controlled and regulated by ESBWR control systems. ESBWR setpoints and controls maintain feedwater within the feedwater temperature operating domain throughout evolutions of balance of plant (BOP) system configurations. Thus, reactor safety is unaffected by operation in a cascade configuration. Cascade configuration does not impact safety-related functions or components.

- The FSAR and DCD describe the design bases, design features, and system functional requirements that are implemented during detailed design and procurement for the construction of the plant. The BOP system capacity identified in the Fermi 3 FSAR supplements will be applied during detailed design activities by implementing the design requirements of the ESBWR DCD. For example, codes and standards referenced by the ESBWR DCD will be implemented as described by the DCD. DCD Chapter 3, "Design of Structures, Components, Equipment, and Systems," describes the ESBWR design criteria, including classification, flood protection, protection against dynamic effects associated with the postulated rupture of piping, and seismic design requirements, among others.
- As described in the DCD, C&FS and CPS will have sufficient capacity and control stability to accommodate normally anticipated step and ramp changes in reactor power.

The staff reviewed the information provided in the applicant's response to RAI 10.04.07-1 relevant to the supplemental information proposed to be added to FSAR Subsection 10.4.7. The RAI response indicates that the C&FS will normally be operated in the pumped forward configuration but may at times be run in a cascade configuration, based on operational conditions and reactor water iodine concentrations, if necessary to control reactor water iodine concentrations.

The staff reviewed the applicant's response as to why the ESBWR safety analyses and anticipated operational occurrence analyses are not impacted by operation of the C&FS in a cascade configuration. The applicant clarifies that when operating in the cascade configuration, the feedwater temperature can be maintained within the feedwater temperature operating domain by placing Feedwater Heater No. 7 into service, if necessary. The staff agreed that the C&FS in the ESBWR DCD bounds the Fermi 3 C&FS operation in the cascade configuration. In addition, the design features and system functional requirements that are in operation during detailed design and procurement will provide for equipment selection that supports the 100 percent feedwater flow through the entire C&FS.

Based on the above review, the staff found the addition of the Supplemental Information EF3 SUP 10.4-2 acceptable because the evaluation of the C&FS in the ESBWR DCD bounds the C&FS cascade configuration operation that the applicant proposed to add to Subsection 10.4.7.2.1 of the Fermi 3 COL FSAR. In addition, the staff verified that this information is in Revision 4 of the FSAR. Therefore, this RAI 10.04.07-1 is closed.

10.4.7.5 *Post Combined License Activities*

There are no post COL activities related to this section.

10.4.7.6 *Conclusion*

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information relating to the C&FS, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the C&FS that were incorporated by reference are resolved.

In addition, the staff compared the supplemental information in the COL application to the relevant NRC regulations, the guidance in Section 10.4.7 of NUREG–0800, and other NRC

RGs. The staff's review concludes that the applicant has satisfactorily addressed Supplemental Information EF3 10.4-2. Furthermore, because the ESBWR DCD bounds C&FS system operation in the cascade configuration, the proposed operation of the C&FS is acceptable since it does not change the conclusions arrived at in NUREG–1966.

10.4.8 Steam Generator Blowdown System (PWR)

As stated in the ESBWR DCD, this section is not applicable to the ESBWR design.

10.4.9 Auxiliary Feedwater System (PWR)

As stated in the ESBWR DCD, this section is not applicable to the ESBWR design.

11.0 RADIOACTIVE WASTE MANAGEMENT

The radioactive waste management systems (RWMS) are designed to control, collect, handle, process, store, and dispose of liquid, gaseous, and solid wastes that may contain radioactive materials. The systems include the instrumentation used to monitor and control the release of radioactive effluents and wastes and are designed for both normal operations (including refueling; purging; fuel handling and storage; radioactive material handling, processing, use, storage, and disposal; maintenance; routine operational surveillance; inservice inspection; and calibration) and anticipated operational occurrences (AOOs) (activities such as loss of power to all recirculation pumps, tripping of the turbine generator set, isolation of the main condenser, and loss of offsite power).

11.1 Source Terms

This section of the Fermi 3 Combined License (COL) Final Safety Analysis Report (FSAR) addresses sources of radioactivity that are generated within the core and have the potential of leaking into the reactor coolant system during normal operation, including an AOO, by way of defects in the fuel cladding. There are two types of source terms for the reactor primary coolant and steam. The first addresses the design basis, and the second describes the anticipated average concentrations in reactor coolant and steam over the life of a boiling-water reactor.

Section 11.1 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 11.1 of the Economic Simplified Boiling-Water Reactor (ESBWR) Design Control Document (DCD), Revision 10, referenced in Appendix E to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants,"," Appendix E, "Design Certification Rule for the Economic Simplified Boiling-Water Reactor," with no departures or supplements. The U.S. Nuclear Regulatory Commission (NRC) staff's finding related to information incorporated by reference is in NUREG–-1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor Standard Design." The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the application and checked the referenced DCD to ensure that no issues relating to this section remained for review.[1] The NRC staff's review confirmed that there are no outstanding issues related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to source terms are resolved.

11.2 Liquid Waste Management System

11.2.1 Introduction

The liquid waste management system (LWMS) is designed to control, collect, process, handle, store, and dispose of liquid radioactive waste generated as the result of normal operation, including AOOs. The LWMS is designed to reduce and control releases of radioactive material into the environment. The LWMS comprises the following four types of major subsystems that are permanently installed equipment connected to other equipment, thus permitting liquid wastes from various plant systems to be segregated and processed separately:

[1] See *"Finality of Referenced NRC Approvals"* in Section 1.2.2 of the safety evaluation report (SER), for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

(1) equipment (low conductivity) drain subsystem
(2) floor (high conductivity) drain subsystem
(3) chemical drain subsystem
(4) detergent drain subsystem

The LWMS process subsystems rely on mixed bed demineralizers, charcoal filters and beds, cartridge filters, reverse osmosis, and organic and neutralization treatments. Cross-connections between subsystems provide additional flexibility in processing wastes by alternate methods and provide redundancy if one subsystem is inoperative. The LWMS normally operates on a batch basis. The system provides for sampling at several process points, administrative controls, and detection and alarms in cases of abnormal conditions against accidental discharges into the environment. The LWMS is located in the radwaste building (RWB). Airborne releases from the LWMS and ventilation exhaust systems servicing radiologically controlled areas are conducted through the RWB stack.

11.2.2 Summary of Application

Section 11.2 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 11.2 of the certified ESBWR DCD, Revision 10. In addition, in FSAR Section 11.2, the applicant provides the following:

COL Items

- STD COL 11.2-1-A Implementation of IE Bulletin 80-10

This COL item addresses LWMS subsystem interfaces and connections that are considered nonradioactive but that could later become radioactive through improper interfaces with radioactive systems, as described in the guidance and information in Inspection and Enforcement (IE) Bulletin 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release to Environment," dated May 6, 1980.

- STD COL 11.2-2-A Implementation of Part 20.1406

This COL item addresses compliance with 10 CFR 20.1406, "Minimization of Contamination," as it relates to the design and operational procedures of LWMS treatment subsystems. In Subsection 11.2.2.3 of the Fermi 3 COL FSAR, the applicant provides additional information identifying various sections of the FSAR (Sections 12.3, 12.5, 12.4, and 13.5) that address how to comply with the requirements of 10 CFR 20.1406.

Supplemental Information

- EF3 SUP 11.2-1 Implementation of Section II.D of Appendix I to Part 50 (cost-benefit analysis)

Section 11.2.1 of the Fermi 3 COL FSAR provides plant- and site-specific cost-benefit analysis. The cost-benefit analysis is based on the guidance of Regulatory Guide (RG) 1.110, "Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors (for Comment)," issued in March 1976. RG 1.110 describes the results that demonstrate compliance with the as low as is reasonably achievable (ALARA) cost-benefit requirements in Section II.D of Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion As Low as is Reasonably Achievable for Radioactive Material in

Light-Water-Cooled Nuclear Power Reactor Effluents," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." The supplemental information presents a cost-benefit analysis demonstrating that any augmentation of the LWMS treatment subsystem is not cost beneficial. The applicant provided additional information on the cost parameters used to determine the total annual cost for the lowest cost systemic augmentation and concluded that no augmentations would be cost beneficial.

- EF3 SUP 11.2-2 Ground Water Protection

In Subsection 11.2.3.2 of the Fermi 3 COL FSAR, the applicant provides supplemental information addressing the monitoring program for the LWMS and plant blowdown underground piping in response to Request for Additional Information (RAI) 12.03-12.04-6 dated August 1, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11215A102).

11.2.3 Regulatory Basis

The regulatory basis for information incorporated by reference is in NUREG-1966. In addition, the relevant requirements of the Commission regulations for the LWMS, and the associated acceptance criteria, are in Section 11.2 of NUREG–0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, (LWR Edition)," the Standard Review Plan (SRP).

NRC staff also followed the guidance in RG 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," issued in June 2007, to evaluate Section 11.2 of the Fermi 3 FSAR for compliance with NRC regulations.

In particular, the regulatory basis for the acceptance of the COL items and supplementary information on the LWMS appears in the following:

- Appendix B, "Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage," to 10 CFR Part 20, "Standards for Protection against Radiation"

- 10 CFR 20.1406, "Minimization of contamination"

- 10 CFR 50.34a, "Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors"

- Sections II.A and II.D of Appendix I to 10 CFR Part 50

The following RGs and NRC documents contain regulatory guidance and positions that may be used in demonstrating compliance with the relevant requirements of the regulations identified above:

- RG 1.109, Revision 1, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," October 1977

- RG 1.110

- IE Bulletin 80-10

11.2.4 Technical Evaluation

As documented in NUREG-1966, NRC staff reviewed and approved Section 11.2 of the certified ESBWR DCD. The staff reviewed Section 11.2 of the Fermi 3 COL FSAR, Revision 7 and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to the LWMS.

In addition, the staff reviewed the applicant's proposed resolution to the COL items and the supplemental information included in Section 11.2 of the Fermi 3 COL FSAR. The staff used the applicable sections of the SRP and RG 1.206 as guidance.

Section 1.2.3 of this safety evaluation report (SER) discusses the NRC's strategy for performing one technical review for each standard issue outside the scope of the design certification and to use this review to evaluate subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for North Anna Unit 3 are equally applicable to the Fermi 3 COL application, the staff undertook the following reviews:

- The staff compared the North Anna Unit 3 COL FSAR, Revision 1, to the Fermi 3 COL FSAR, Revision 3. In performing this comparison, the staff considered changes to the Fermi 3 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the North Anna SER with open items.

- The staff confirmed that the applicant has endorsed all responses to the RAIs identified in the corresponding standard content evaluation (the North Anna SER).

- The staff verified that the site-specific differences are not relevant to this section of the Fermi 3 COL application.

The staff completed the review and found the evaluation of the North Anna standard content to be applicable to the Fermi 3 COL application. This SER identifies the standard content material with italicized, double-indented formatting.

The staff reviewed the information in the Fermi 3 COL FSAR as follows.

COL Items

- STD COL 11.2-1-A Implementation of IE Bulletin 80-10

The following portion of this technical evaluation section is reproduced from Section 11.2.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091670733):

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

- *STD COL 11.2-1-A Implementation of IE Bulletin 80-10*

The guidance from Bulletin 80-10 includes information on the identification and restriction of non-contaminated systems that have the potential of becoming contaminated. The applicant has addressed this COL information item in the COL application with STD COL 11.2-1-A. In FSAR Section 11.2.2.3, "Detailed System Component Description," the applicant proposes to use specific equipment connection configurations and plant sampling. Specifically, the use of double-check valves in each line where a non-radioactive system is connected to a radioactive or potentially radioactive system. A tell-tale connection is proposed for installation in each line to confirm the integrity of the line and check valves. FSAR, Revision 0, stated that to ensure that contamination has not occurred in permanently installed clean systems, sampling of these systems further upstream has been included in the plant sampling program.

FSAR Section 11.2.2.3 presents an updated description of some portions of the LWMS that sample the permanently installed non-radioactive plant system in upstream locations of radioactive systems, to avoid uncontrolled and unmonitored releases into the environment. A review of that information indicates that there is no specific information describing those sampling provisions or where samples would be collected to confirm that clean plant systems have not been cross-contaminated by radioactive process streams. This information would ensure that appropriate provisions are identified in the FSAR and are not likely to be omitted during the development of the sampling and analysis program for the North Anna 3 ODCM (Offsite dose calculation manual), confirming compliance with liquid effluent concentration limits of Table 2 in Appendix B to 10 CFR Part 20 and design objectives in Appendix I to 10 CFR Part 50. Accordingly, RAI 11.02-2 requested the applicant to update FSAR Section 11.2.2.3 with specific references to the DCD and/or other FSAR sections where this information is provided and, if not, to supplement the appropriate FSAR sections with additional details. The applicant responded by providing additional information and proposed a revision to STD COL 11.2-1-A. The revision clarifies that plant procedures would describe the sampling of non-radioactive systems that could become potentially contaminated through the improper interface with radioactive systems. The proposed revision also notes that the determination of which system to consider and sample would be based on the requirements contained in the plant ODCM. The ODCM takes into account site-specific conditions and guidance from RG 1.109 in identifying exposure pathways and offsite dose receptors. The staff finds that these design features and operational program demonstrate compliance with IE Bulletin 80-10 and are therefore acceptable. This RAI is closed.

The staff thus concluded that STD COL 11.2-1-A is consistent with IE Bulletin 80-10 and is therefore acceptable.

- STD COL 11.2-2-A Implementation of Part 20.1406

Subsection 12.3.1.5 of the Fermi 3 COL FSAR addresses this COL item by providing information on design, operational, and programmatic considerations to minimize contamination

and ensure compliance with 10 CFR 20.1406. The staff's evaluation of this information is in Section 12.3.4 of this SER.

Supplemental Information

- EF3 SUP 11.2-1 Implementation of, Section II.D of Appendix I to Part 50 (cost-benefit analysis)

The applicant used the guidance in RG 1.110 to determine when it is economically feasible to implement an augmented system to reduce radiation exposure below the regulatory threshold. The applicant indicated that the conceptual design of the ESBWR already contains all of the liquid radwaste augmentations identified in RG 1.110. Therefore, the applicant concluded that a cost-benefit analysis is not necessary. In addition, the ESBWR LWMS is designed with the capacity to recycle 100 percent of liquid radwaste (zero liquid release), as noted in ESBWR DCD, Table 11.5-7. However, the applicant reported the collective radiation doses for the liquid pathway in Chapter 12, Table 12.2-204 of the Fermi 3 COL FSAR. This analysis was inconsistent with the assumption of zero liquid release. Therefore, the staff issued RAI 11.02-1 asking the applicant to perform an appropriate cost-benefit analysis using the method and data outlined in RG 1.110.

In the response to this RAI dated April 8, 2009 (ADAMS Accession No. ML091060496), the applicant provides a detailed analysis demonstrating that the design of the Fermi 3 LWMS complies with the ALARA cost-benefit requirements in Section II.D of Appendix I to 10 CFR Part 50. The applicant uses RG 1.110 methodology and provides the cost parameters taken without exception from RG 1.110. The applicant revised FSAR Section 11.2.1 and provided the results of the cost-benefit analysis and supporting data using the guidance in RG 1.110. The applicant's analysis shows that the lowest cost option for the LWMS augmentation is a 75.7-liter-per-minute (Lpm) (20-gallon-per-minute [gpm]) filter cartridge at a cost of $11,900 per year, resulting in a corresponding collective dose of 11.9 person-rem to the total body or thyroid. Subsection 12.2.2.4.2 of the Fermi 3 COL FSAR states that annual collective population doses resulting from liquid effluent releases are estimated to be 14.9 person-rem to the total body and 30.1 person-rem to the thyroid based on the LWMS described in the ESBWR DCD. Given that the 75.7-Lpm (20-gpm) filter cartridge augmentation would treat only 20 percent of the total liquid radwaste discharge, the resulting cost-benefit ratio is greater than the $1,000 per person-rem criterion in Section II.D of Appendix I to 10 CFR Part 50, for both the total body and thyroid. Thus, the applicant concluded that the LWMS meets the ALARA requirement and no further system augmentations are necessary.

The staff conducted an independent assessment of the applicant's cost-benefit analysis using the information in the response to this RAI and in FSAR Subsection 12.2.2.4.2 about collective population doses, as well as the guidance in RGs 1.110 and 1.109. The staff's analysis find exact agreement with the applicant's cost-benefit results. Therefore, the staff finds that EF3 SUP 11.2-1 meets the requirements of Section II.D of Appendix I to 10 CFR Part 50 and is therefore acceptable, and RAI 11.02-1 is resolved.

- EF3 SUP 11.2-2 Ground Water Protection

In Subsection 11.2.3.2 of the Fermi 3 COL FSAR, the applicant provides supplemental information addressing the monitoring program for the LWMS and plant blowdown underground piping, in response to RAI 12.03-12.04-6. In SER Section 12.3.4 under COL Item

STD COL 12.3-4-A, the staff evaluated the required monitoring program for the underground piping to ensure that the potential for unmonitored, uncontrolled releases of radioactivity into the environment is minimized, in accordance with the requirements of 10 CFR 20.1406. Therefore, the staff finds EF3 SUP 11.2-2 acceptable.

11.2.5 Post-Combined License Activities

There are no post COL activities related to this section.

11.2.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG-1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant addressed the required information related to the LWMS, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the LWMS that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in SRP Section 11.2, NRC RGs, and industry standards. The staff's concludes that the LWMS (as a permanently installed system and in combination with other plant systems) includes the equipment necessary to control releases of radioactive materials in liquid effluents, in accordance with the requirements in 10 CFR 50.34a. Furthermore, the staff concludes that the LWMS is acceptable and meets the requirements in 10 CFR 50.34a and Section II.D of Appendix I to 10 CFR Part 50, as well as the guidance in RGs 1.109 and 1.110 and IE Bulletin 80-10. This conclusion is based on the following:

- Using site-specific conditions, the applicant meets the ALARA criterion required in Section II.D of Appendix I to 10 CFR Part 50. The staff considers the potential effectiveness of augmenting the LWMS using items of reasonably demonstrated technology. The staff determines that further treatment is not expected to produce further reductions in collective population doses reasonably expected within an 80-kilometer (50-mile) radius of the reactor, at a cost of less than $1,000 per person-rem or person-thyroid-rem.

- The staff determines that the applicant adequately addressed the standard COL items regarding IE Bulletin 80-10 and 10 CFR 20.1406.

11.3 Gaseous Waste Management System

11.3.1 Introduction

The gaseous waste management system (GWMS) is designed to receive and process radioactive gases and hydrogen-bearing gases generated during process operation. The gaseous radioactive effluents come from two main sources in the plant: (1) building ventilation systems servicing radiologically controlled areas; and (2) the power cycle offgas system (OGS). The GWMS and its OGS are used to control, collect, process, hold for decay, and discharge gaseous radioactive wastes generated during normal operation, including AOOs. The OGS is located in the turbine building and its major components include preheaters; recombiners; cooler/condensers; dryers; activated charcoal beds (guard and delay); and associated valves, pumps, and instrumentation. The gases removed from the condenser are radioactive. They must therefore be treated before being released into the environment to ensure that radioactivity levels are reduced to acceptable levels and are ALARA. The GWMS is designed to reduce and control radioactivity releases into the environment. Releases from the OGS are conducted via the turbine building stack. Releases from building ventilation exhaust systems servicing radiologically controlled areas are conducted through their respective buildings: reactor/fuel building stack, turbine building stack, and RWB stack.

11.3.2 Summary of Application

Section 11.3 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 11.3 of the certified ESBWR DCD, Revision 10. In addition, in FSAR Section 11.3, the applicant provides the following:

Supplemental Information

- EF3 SUP 11.3-1 — Implementation of Section II.D of Appendix I to Part 50 (cost-benefit analysis)

The applicant used RG 1.110 as the basis for a cost-benefit evaluation to assess gaseous radwaste system augmentations. The results of the cost-benefit analysis demonstrate compliance with the ALARA cost-benefit requirements in Section II.D of Appendix I to 10 CFR Part 50. The applicant considered augmentations applicable to the ESBWR conceptual design and concluded that no gaseous radioactive waste system augmentations are cost beneficial.

11.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG-1966. In addition, the relevant requirements of the Commission regulations for the GWMS, and the associated acceptance criteria, are in Section 11.3 of the SRP.

The staff also followed the guidance in RG 1.206 to evaluate Section 11.3 of the Fermi 3 COL FSAR for compliance with NRC regulations.

In particular, the regulatory basis for acceptance of the supplementary information on GWMS appears in the following:

- 10 CFR 50.34a

- Sections II.B, II.C, and II.D of Appendix I to 10 CFR Part 50

The following RGs and NRC documents contain regulatory guidance and positions that may be used in demonstrating compliance with the relevant requirements of the regulations identified above:

- RG 1.109
- RG 1.110

11.3.4 Technical Evaluation

As documented in NUREG-1966, NRC staff reviewed and approved Section 11.3 of the certified ESBWR DCD. The staff reviewed Section 11.3 of the Fermi 3 COL FSAR, Revision 7 and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to the GWMS.

The staff reviewed the relevant information in the supplement. The following paragraphs discuss the staff's evaluations of the applicant's information on specific technical and regulatory topics.

Supplemental Information

- EF3 SUP 11.3-1 — Implementation of Section II.D of Appendix I to Part 50 (cost-benefit analysis)

The applicant included a plant- and site-specific cost-benefit analysis to justify, in part, the GWMS design. The applicant based the cost-benefit analysis on the guidance in RGs 1.110 and 1.109, and the results demonstrate compliance with the ALARA cost-benefit requirements in Section II.D of Appendix I to 10 CFR Part 50. The applicant's analyses assessed the merits of installing (1) a 3-ton charcoal absorber, (2) charcoal vault refrigeration, (3) a main condenser vacuum pump charcoal/high-efficiency particulate air (HEPA) filtration system, (4) a 424.75-cubic-meter-per-minute (15,000-cubic-foot-per-minute) HEPA filtration system, (5) a charcoal/HEPA filtration system, and (6) a 17-cubic-meter (600-cubic-foot) gas decay tank. The applicant concluded that none of these system improvements is cost beneficial and therefore, the applicant did not propose any system augmentations.

The staff performed an independent assessment of the applicant's cost-benefit analysis using information in the application. But lacking the specific details of the applicant's analysis, the staff was unable to reproduce those results. Therefore, the staff issued RAI 11.03-1 asking the applicant to provide additional information on the approach used to conduct the GWMS cost-benefit analysis.

In the response to this RAI dated April 23, 2009 (ADAMS Accession No. ML091250352), the applicant clarified the approach used to conduct the GWMS cost-benefit analysis. The applicant identified RG 1.110 as the basis for the GWMS cost-benefit analysis. The staff reviewed the

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

calculations and found exact agreement with the applicant's cost-benefit results. Therefore, the staff determined that none of the GWMS augmentations is cost beneficial.

In March 2010, Revision 7 of the ESBWR DCD was issued with the revised gaseous effluent source term. The applicant issued Revision 2 of the Fermi 3 COL FSAR in March 2010 but did not revise the gaseous source term to be consistent with the DCD. Therefore, the use of the population doses based on the gaseous effluent in DCD Revision 6 was no longer valid for the cost-benefit analysis. In February 2011, the applicant issued Revision 3 of the Fermi 3 COL FSAR with new population dose values based on the site-specific reactor water radioiodine concentrations, as explained in Section 12.2.4 of this SER. The staff reviewed the new cost-benefit analysis results and agreed with the applicant's restated conclusion that none of the augmentations is cost beneficial. Therefore, RAI 11.03-1 is resolved.

The staff determined that the GWMS is acceptable and meets the requirements in 10 CFR 50.34a and Section II.D of Appendix I to 10 CFR Part 50, as well as the guidance of RGs 1.109 and 1.110. This conclusion is based on the staff's finding that using site-specific conditions, the applicant has met the ALARA criterion required in Section II.D of Appendix I to 10 CFR Part 50. The staff considered the potential effectiveness of augmenting the GWMS using items of reasonably demonstrated technology. The staff determined that additional treatment is not expected to produce further reductions in collective population doses, reasonably expected within an 80-kilometer (50-mile) radius of the reactor at a cost of less than $1,000 per person-rem or person-thyroid-rem.

11.3.5 Post Combined License Activities

There are no post COL activities related to this section.

11.3.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG-1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant addressed the required information related to the GWMS, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the GWMS that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in SRP Section 11.3, NRC RGs, and industry standards. The staff concludes that the GWMS includes the equipment necessary to control releases of radioactive materials in gaseous effluents in accordance with the requirements in 10 CFR 50.34a. Furthermore, the staff concludes that the GWMS is acceptable and meets the requirements in 10 CFR 50.34a and Section II.D of Appendix I to 10 CFR Part 50, as well as the guidance of RGs 1.109 and 1.110.

11.4 Solid Waste Management System

11.4.1 Introduction

- The Solid Waste Management System (SWMS) is designed to provide collection, processing, packaging, and storage of radioactive wastes such as spent resins, sludge, oil waste, and dry active waste (DAW) produced during normal operation and AOOs including startup, shutdown, and refueling operations. The SWMS is located in the RWB and is designed to collect, process, control, package, and temporarily store wet and dry solid radioactive wastes before shipment. The SWMS processes wastes from the LWMS, reactor water cleanup/shutdown cooling system, fuel and auxiliary pools cooling system, and condensate purification system. The SWMS comprises the following four subsystems:

- SWMS collection subsystem

- SWMS processing subsystem

- dry solid waste accumulation and conditioning subsystem

- container storage subsystem

The SWMS collection subsystem consists of high- and low-activity resin holdup tanks, phase separators, a condensate resin holdup tank, decant pumps, sampling points, control panels, instrumentation, vents and drains, and high- and low-activity transfer pumps. There are no provisions to release liquid and gaseous wastes directly from the SWMS system. All liquid effluent releases are conducted through the LWMS for process liquids generated during the operation of the SWMS. Airborne releases from the SWMS and ventilation exhaust systems servicing radiologically controlled areas, where process equipment is located, are monitored and discharged through the RWB stack.

The container storage subsystem and the dry solid waste accumulation and conditioning subsystem are conceptual descriptions of methods the COL licensee would use to handle and process solid wastes and packaged solid wastes. Therefore, the DCD describes the process without including equipment and system flow diagrams. Figures 11.4-1 and 11.4-4 in DCD Tier 2, Revision 9 provide overviews of the processes that would be used to handle dry solid and wet wastes. The COL applicant will address the actual processes in its operational programs and procedures, which will consider the regulatory requirements of the NRC, U.S. Department of Transportation (DOT), and State and local agencies for processing, storing, packaging, shipping, radiological monitoring, and disposing of radioactive wastes.

11.4.2 Summary of Application

Section 11.4 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 11.4 of the certified ESBWR DCD, Revision 10. In addition, in FSAR Section 11.4, the applicant provides the following:

Tier 2 Departure Not Requiring Prior NRC Approval

- EF3 DEP 11.4-1 — Long-Term, Temporary Storage of Class B and C Low-Level Radioactive Waste

The ESBWR DCD identifies that the RWB provides onsite storage space for a 6-month volume of packaged waste. The applicant states that Departure EF3 DEP 11.4-1 configures the Fermi 3 RWB to accommodate a minimum of 10 years of Class B and C waste, while maintaining space for at least 3 months of packaged Class A waste. This departure is accomplished by reconfiguring the arrangement of systems and components within the design of the ESBWR RWB. The applicant provides various revised tables and figures for the new arrangement of systems and components in the reconfigured RWB.

COL Items

- STD COL 11.4-1-A — SWMS Processing Subsystem Regulatory Guide Compliance

The COL applicant is responsible for ensuring that SWMS subsystems comply with the guidance of RG 1.143, Revision 2, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants," and RG 8.8 Revision 3, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be as Low as Is Reasonably Achievable," issued in June 1978 for the testing and operation of all SWMS subsystems. The applicant provides additional information on the SWMS testing according to guidance in RG 1.143 and RG 8.8.

- STD COL 11.4-2-A — Compliance with IE Bulletin 80-10

This COL item addresses the evaluation of the SWMS subsystems against the guidance and information in IE Bulletin 80-10 in identifying and rectifying connections to systems that are considered nonradioactive, but that could become radioactive through improper interfaces with radioactive systems (i.e., a nonradioactive system that could become contaminated as a result of leakage, valving errors, or other operating conditions in radioactive systems). The applicant provides additional details about the types of design features, including the installation of double check valves and tell-tale connections, for the purpose of confirming the integrity of SWMS piping and connections. Normal sample points are provided further upstream will be included in the plant-specific sampling program.

- STD COL 11.4-3-A — Process Control Program

The applicant includes by reference Nuclear Energy Institute (NEI) 07-10A, Revision 0, "Generic FSAR Template Guidance for Process Control Program (PCP)," issued in March 2009 (ADAMS Accession No. ML091460627), as the basis for the PCP. The applicant notes that Section 13.4 of the Fermi 3 COL FSAR addresses the milestones for developing and implementing the PCP.

- STD COL 11.4-4-A — Temporary Storage Facility

In Revision 2 of the Fermi 3 COL FSAR, the applicant indicates that the RWB was reconfigured to accommodate at least 10 years of packaged Class B and C waste and approximately 3 months of packaged Class A waste, during routine operations and AOOs.

- STD COL 11.4-5-A Compliance with Part 20.1406

This COL item addresses site-specific information for demonstrating compliance with 10 CFR 20.1406 and RG 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning," issued in June 2008, as it relates to the design and operational procedures of SWMS treatment subsystems to minimize contamination, facilitate eventual decommissioning, and minimize the generation of radioactive waste. In Section 11.4.1 of the Fermi 3 COL FSAR, the applicant provides additional information identifying various sections of the FSAR (Sections 12.3, 12.4, 12.5, and 13.5) that address how to comply with the implementation of 10 CFR 20.1406.

Supplemental Information

- EF3 SUP 11.4-1 Implementation of Section II.D of Appendix I to Part 50 (cost-benefit analysis)

In Section 11.4.1 of the Fermi 3 COL FSAR, Revision 2, the applicant presents supplemental information on the cost-benefit analysis for the SWMS and references the cost-benefit analyses in FSAR Sections 11.2.1 and 11.3.1 for processing and treating liquid and gaseous effluents as byproducts of the SWMS operation. Hence, no augmentations are needed for the SWMS.

11.4.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG-1966. In addition, the relevant requirements of the Commission regulations for the SWMS, and the associated acceptance criteria, are in Section 11.4 of NUREG–0800.

The staff also followed the guidance in RG 1.206 to evaluate Section 11.4 of the Fermi 3 COL FSAR for compliance with NRC regulations.

In particular, the regulatory basis for acceptance of the supplementary information on the SWMS appears in the following:

- 10 CFR 20.1406
- Sections II.A, II.B, II.C and II.D of Appendix I to 10 CFR Part 50
- 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

The following RGs and NRC documents contain regulatory guidance and position that may be used in demonstrating compliance with the relevant requirements of the regulations identified above:

- RG 1.109
- RG 1.110
- IE 80-10
- RG 8.8
- RG 1.143

- Generic Letter (GL) 89–01, "Implementation of Programmatic and Procedural Controls for Radiological Effluent Technical Specifications"

In addition, in accordance with Section VIII, "Processes for Changes and Departures," of "Appendix E to Part 52--Design Certification Rule for the Economic Simplified Boiling Water Reactor," the applicant identifies one Tier 2 departure. Tier 2 departures not requiring prior NRC approval are subject to the requirements of 10 CFR Part 52, Appendix E, Section VIII.B.5, which are similar to the requirements of 10 CFR 50.59.

11.4.4 Technical Evaluation

As documented in NUREG-1966, NRC staff reviewed and approved Section 11.4 of the certified ESBWR DCD. The staff reviewed Section 11.4 of the Fermi 3 COL FSAR, Revision 7 and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to the SWMS.

In addition, the staff reviewed the applicant's proposed resolution to the COL items and the departure included in Section 11.4 of the Fermi 3 COL FSAR. The staff used the applicable sections of the SRP and RG 1.206 as guidance.

As stated above, Section 1.2.3 of this SER discusses the NRC's strategy for performing one technical review for each standard issue outside the scope of the design certification and to use this review to evaluate the subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for North Anna Unit 3 are equally applicable to the Fermi 3 COL application, the staff undertook the following reviews:

- The staff compared the North Anna Unit 3 COL FSAR, Revision 1, to the Fermi 3 COL FSAR, Revision 3. In performing this comparison, the staff considered changes made to the Fermi 3 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the North Anna SER with open items.

- The staff confirmed that the applicant has endorsed all responses to the RAIs identified in the corresponding standard content evaluation (the North Anna SER).

- The staff verified that the site-specific differences are not relevant to this section of the Fermi 3 COL application.

The staff completed the review and found the evaluation of the North Anna standard content to be applicable to the Fermi 3 COL application. This SER identifies the standard content material with italicized, double-indented formatting.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

Tier 2 Departure Not Requiring Prior NRC Approval

- EF3 DEP 11.4-1 — Long-Term, Temporary Storage of Class B and C Low-Level Radioactive Waste

This departure identifies a plant-specific deviation from design information in the ESBWR DCD for low-level radioactive waste storage. The Fermi 3 RWB is configured to accommodate a minimum of 10 years of Class B and C waste, while maintaining space for at least 3 months of packaged Class A waste. The departure is accomplished by reconfiguring the arrangement of systems and components within the ESBWR RWB. The applicant provides various figures and tables in Section 11.4 of the Fermi 3 COL FSAR to identify changes in equipment and systems. The applicant also adds figures and tables to Section 12.3 that identify the revised layout and radiation protection needs. The major change to Section 11.4 is the elimination of the condensate resin transfer pumps and the addition of high- and low-activity circulation pumps (Figures 11.4-1R and 11.4-2R and Table 11.4-1R). In addition, the applicant identifies the estimated annual volume of radwaste requiring long-term management in FSAR Table 11.4-2R.

In Part 7, "Departure Report," of the COL application Revision 2, the applicant provided the results of its evaluation of this departure. The applicant added that the departure affects both the Tier 1 and Tier 2 information, but the departure has no safety significance. The applicant identified the Tier 1 changes as changes to the description of the locations of area radiation monitors in the RWB.

The staff reviewed the applicant's information in Parts 2, 7, and 10 of the COL application. The revised Table 2.3.2-1 reports the changes affecting Part 10 that relate to inspections, tests, analyses, and acceptance criteria (ITAAC). A comparison of this table to the table in ESBWR DCD, Tier 1, Table 2.3.2-1, reveals that the proposed changes relate to the RWB layout changes, specifically to the renaming of the assigned locations. The staff found that this name change does not present a risk to public health and safety.

The applicant's supplemental response to RAI 11.04-2 dated June 17, 2011 (ADAMS Accession No. ML11171A297), eliminates the Tier 1 changes previously provided under Departure EF3 DEP 11.4-1 in Parts 7 and 10 of the COL application. The applicant eliminates the proposed name changes in the description and locations and reverts back to the original names listed in ESBWR DCD, Tier 1 and Tier 2. The staff reviewed these name changes and concurred with the applicant that the proposed changes are consistent with the ESBWR DCD, and EF3 DEP 11.4-1 does not affect Tier 1 information and ITAAC.

With regard to storage capacity, Table 11.4-2-R shows that Class B and C wastes are generated at a rate of about 15.6 cubic meters per year (m^3/yr) (552 cubic feet per year [ft^3/yr]), requiring 156 m^3 (5,520 ft^3) of storage volume for a 10-year inventory. The same table shows a 3-month Class A waste volume of 91 m^3/yr (3,210 ft^3/yr) for DAW and about 24 m^3/yr (874.6 ft^3/yr) for wet solid waste. Figure 1.2-23R (depicting the RWB at elevation 4650) indicates the storage of Class B and C wastes in Room 6390, Class A wet solid waste in Room 6391, and Class A DAW in Room 6392. The staff reviewed these rooms and determined that all three rooms have sufficient surface area and volume to store the waste for the required period. Therefore, the staff concluded that the new storage areas for managing Class A, B, and C radioactive wastes have sufficient volume to accommodate the accumulated waste.

The staff's review of Figures 11.4-1R and 11.4-2R in the Fermi 3 COL FSAR noted that the SWMS process diagram includes dual pumps in series in two places, with no holding tank or

other equipment separating the pumps. This configuration is shown for (1) the reactor water cleanup system/fuel and auxiliary pools cooling system, with the top process line indicating the high-activity circulation and high-activity transfer pumps; and (2) the condensate filter backwash drain/equipment-floor drain subsystem filter backwash drain/dewatering fill head, with the lower process line indicating the low-activity circulation and low-activity transfer pumps. The diagram shows these pumps as dual pumps in series, but it does not indicate whether these pumps provide redundancy because they lack isolation valves. The staff issued RAI 11.04-4 asking the applicant to clarify the system and the use of the identified pumps. The applicant's response to this RAI dated June 17, 2011 (ADAMS Accession No. ML11171A297), provides additional information on the design changes and operation of the pumps. The applicant identifies the pumps in series as air-operated diaphragm pumps, which are not prone to cavitation. The staff's review of the applicant's response determined that the applicant has provided adequate information to meet the guidance of RG 1.143. In addition, the staff agreed with the applicant's statement that these pumps are not prone to cavitation. The diaphragm pumps can operate at an infinitely variable pumping rate and pressure, they can run dry indefinitely, and their discharge can be throttled to zero flow. Therefore, this RAI is resolved. However, a further review of the SWMS process diagrams (FSAR Figures 11.4-1R and 11.4-2R) identified inconsistencies between them. The staff informed the applicant of these inconsistencies on July 14, 2011. The applicant's supplemental response to RAI 11.04-4 dated August 24, 2011 (ADAMS Accession No. ML11238A049), provides a revised FSAR Figure 11.4-1R correcting the inconsistencies. The staff found that this figure is consistent with the process diagram in FSAR Figure 11.4-2R, and this RAI is closed. The staff tracked the verification that the next FSAR revision includes this change as Confirmatory Item 11.04-4. The staff verified that FSAR Revision 4 includes the revised Figure 11.4-1R. Therefore, Confirmatory Item 11.04-4 is resolved.

In the supplemental response to RAI 11.04-4 dated August 24, 2011, the applicant states that Departure EF3 DEP 11.4-1 only affects Tier 2, and its evaluation determined that this departure does not require prior NRC approval in accordance with Appendix E to 10 CFR Part 52. The NRC staff finds it reasonable that the departure does not require prior NRC approval. The applicant's process for evaluating departures and other changes to the DCD is subject to NRC inspections.

COL Items

- STD COL 11.4-1-A — SWMS Processing Subsystem Regulatory Guide Compliance

The following portion of this technical evaluation section is reproduced from Section 11.4.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091670733):

> - *STD COL 11.4-1-A — SWMS Processing Subsystem Regulatory Guide Compliance*
>
> *The COL item addresses the compliance of the SWMS subsystems with the guidance in RG 1.143, Revision 2, and RG 8.8 for the testing and operation of all SWMS subsystems. The applicant addressed this information item in STD COL 11.4-1-A. The applicant notes that SWMS subsystems used to process wet solid radioactive wastes are tested using a process that complies with RG 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-*

Cooled Nuclear Power Plants." The staff finds that the information provided by the applicant is acceptable. Therefore, COL Item 11.4.-1-A has been satisfied. The evaluation of the compliance with RG 8.8 is addressed in Section 12.1 of the SER.

The applicant supplemented STD COL 11.4-1-A with EF3 SUP 11.4-1. As described in Section 12.1 of the SER, the applicant's additional information is consistent with RG 1.143 and RG 8.8 and is therefore acceptable.

- *STD COL 11.4-2-A Compliance with IE Bulletin 80-10*

The COL item addresses the evaluation of the SWMS subsystems against the guidance and information in IE Bulletin 80-10. The purpose is to identify and rectify connections to systems that are considered nonradioactive but that could become radioactive through improper interfaces with radioactive systems (i.e., a non-radioactive system that could become contaminated due to leakage, valving errors, or other operating conditions in radioactive systems). Bulletin 80-10 includes information on identifying and restricting non-contaminated systems that could become contaminated.

The applicant has addressed this COL information item in the COL application with STD COL 11.4-2-A. FSAR Section 11.4.2.3, "Detailed System Component Description," presents an updated description of some portions of the SWMS on sampling permanently installed non-radioactive plant system in upstream locations of radioactive systems. These provisions are intended to avoid uncontrolled and unmonitored releases into the environment. Specifically, the applicant proposes using double-check valves in each line where a non-radioactive system is connected to a radioactive or potentially radioactive system. These valves are expected to service subsystems connected to non-radioactive portable systems. The installation of tell-tale connection in each line is expected to confirm the integrity of the line and check valves. FSAR, Revision 0, stated that to ensure that contamination has not occurred in permanently installed clean systems, sampling these systems further upstream is included in the plant sampling program.

A review of the above information indicates that there is no FSAR specific description of those sampling provisions, or where samples would be collected, to confirm that clean plant systems have not been cross-contaminated by radioactive process streams. Accordingly, the applicant was requested under RAI 11.04-2 to update FSAR Section 11.4.2.3 with specific references to ESBWR DCD and/or other FSAR sections where this information is provided, or to supplement the appropriate FSAR sections with additional details. The purpose of this RAI is to ensure that these provisions are identified in the FSAR and are not likely to be omitted during the development of the sampling and analysis program for the North Anna 3 ODCM, and for confirming compliance with liquid effluent concentration limits in Table 2 (Column 2) in Appendix B to 10 CFR Part 20 and design objectives of Appendix I to 10 CFR Part 50. The applicant responded with a proposed revision to FSAR Section 11.4.2.3.5. The revised section identifies plant-specific procedures and notes that the ODCM would address potential

conditions where normally non-radioactive systems might become contaminated. The staff finds that these design features and operational program demonstrating compliance with IE Bulletin 80-10. The staff therefore finds the response acceptable, and this RAI is closed.

In Subsection 11.4.2.3.5 of the Fermi 3 COL FSAR, Revision 7 the applicant states that plant-specific procedures describe the sampling of nonradioactive systems that could potentially become contaminated by cross-connection with systems that contain radioactive material. In addition, the ODCM will address potential conditions where normally nonradioactive systems might become contaminated. The staff finds this information to be consistent with IE Bulletin 80-10 and therefore acceptable.

- *STD COL 11.4-3-A Process Control Program*

The COL item addresses the implementation of a plant-specific PCP using operating procedures and technical specifications, as they relate to the classification, treatment, and disposal of radioactive wastes processed by the SWMS in accordance with NRC, DOT and State and local agency regulatory requirements. The applicant includes, by reference, NEI Template 07-10 as the basis for the PCP. The NEI template presents the functional elements of a PCP, which, if met, would demonstrate compliance with 10 CFR 50.34a and 50.36a. The template describes technical and regulatory considerations used to process solid, wet, and liquid wastes with selected waste processing technologies and methods. The PCP identifies surveillance requirements that are consistent with the plant's technical specifications, administrative procedures, operational procedures, quality assurance and quality control program, radiological controls and monitoring program, information to be contained in annual radiological effluent release reports, reporting requirements to the NRC, instructions on using the NRC uniform radioactive shipping waste manifest, and the process for initiating and documenting changes to the North Anna 3 PCP and its supporting procedures. The basis for acceptance in the staff's review is conformance of the applicant's endorsement of the DCD SWMS design and proposed North Anna 3 PCP. The milestones for the development and implementation of the PCP are addressed in FSAR, Revision 1, Section 13.4 of the North Anna 3 COL. NRC staff finds that this item is satisfactorily addressed in FSAR Section 13.4, Table 13.4-201 (item 9), which lists the milestones for the development and implementation of the PCP before fuel load, with the requirement identified as a license condition. The applicant was requested, under RAI 11.04-1B, to update this milestone in FSAR Section 11.4.2.3, STD COL 11.4-3-A by referencing NEI PCP Template 07-10 in applicable FSAR subsections and references. The applicant responded with a proposed revision to STD COL 11.4-3-A once NEI PCP Template 07-10 has been issued. NEI PCP Template 07-10A (Revision 0, March 2009) has been reviewed and found acceptable by the staff. The results of the staff's evaluation are presented in ML082910077 and the NEI PCP Template 07-10A is presented in ML091460236. The staff concluded that STD COL 11.4-3-A meets the requirements and is acceptable (process control program compliance with 10 CFR 50.34a and 50.36a).

In Subsection 11.4.2.3.5 of the Fermi 3 COL FSAR, Revision 7 the staff finds the applicant's resolution of STD COL 11.4-3-A for waste classification and process control to be consistent with NEI 07-10A and is therefore acceptable. Section 13.4, "Operational Programs Required by NRC Regulations," of the Fermi 3 COL FSAR addresses the milestones for developing and implementing the PCP before the fuel loading. In Table 13.4-201, the applicant identifies the Commitment (COM 13.4-011) to track a license condition for implementation milestones related to the PCP. Commitment 13.4-011 is that same as Commitment 11.05-001 presented in FSAR Chapter 11.4. The staff reviewed the applicant's Commitment (COM 11.5-001) to address the milestones for developing and implementing the PCP and found the commitment acceptable. The staff designated Commitment (COM 13.4-011) as License Condition 11-1.

- STD COL 11.4-4-A Temporary Storage Facility

In previous revisions of the Fermi 3 COL FSAR, the applicant stated that Fermi 3 does not use any temporary storage facilities to support plant operation. The corresponding ESBWR DCD Tier 2 COL item states that it is the responsibility of the COL applicant to consider the development of an overall site management plan for the storage of radioactive waste using the guidance of SRP Section 11.4. Because Section 11.4.1 of the DCD states that the plant provides a storage capacity for 6 months, NRC staff issued RAI 11.04-2 asking the applicant to address the long-term management and storage of radioactive wastes.

In the response to this RAI dated April 8, 2009 (ADAMS Accession No. ML091060496), the applicant agreed to develop clarifying information for a future submission to the COL application. In March 2010, the applicant submitted FSAR Revision 2, which included supplemental information on the long-term management and storage of radioactive waste under Departure EF3 DEP 11.4-1. Therefore, this RAI is resolved. The staff evaluated the availability of temporary storage under Departure EF3 DEP 11.4-1.

- STD COL 11.4-5-A Compliance with Part 20.1406

The applicant states that FSAR Subsection 12.3.1.5 addresses this COL item. Subsection 12.3.1.5 provides information on design features as well as on measures used in operating procedures to minimize contamination and to ensure compliance with 10 CFR 20.1406. Section 12.3.4 of this SER provides the staff's evaluation of this information.

Supplemental Information

- EF3 SUP 11.4-1 Implementation of Section II.D of Appendix I to Part 50 (cost-benefit analysis)

The applicant added a new supplement (EF3 SUP 11.4-1) to Section 11.4.1 of the Fermi 3 COL FSAR, Revision 2, which states that the cost-benefit analyses in Sections 11.2.1 and 11.3.1 include the incremental amounts of liquid and gaseous wastes that would be produced during the operation of the SWMS. As a result, no other SWMS design augmentations are necessary to handle the incremental amounts of liquid and gaseous wastes. The staff found the applicant's supplemental information acceptable, because the cost-benefit analyses in FSAR Sections 11.2 and 11.3 consider routinely expected sources of radioactivity discharged via the three plant stacks. For example, releases from the RWB ventilation exhaust systems servicing radiologically controlled areas—including the SWMS components—and the venting of SWMS tanks and vessels are conducted through the RWB stack. As a result, all releases from the SWMS are monitored and controlled at the release point, and all releases

controlled through the implementation of the ODCM. Therefore, the staff concluded that the applicant has adequately addressed EF3 SUP 11.4-1.

11.4.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the staff has identified the following license condition:

- License Condition (11-1) - At least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a), DTE Electric Company shall implement an operational program for process and effluent monitoring and sampling, including the subprogram and documents for a PCP. No later than 12 months after issuance of the COL, the licensee shall submit to the Director of the Office of New Reactors (NRO) a schedule that supports planning for and conduct of NRC inspections of the operational program for process and effluent monitoring and sampling (including the PCP). The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the operational program for process and effluent monitoring and sampling (including the PCP) has been fully implemented. (COM 13.4-011)

11.4.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG-1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the relevant information relating to the SWMS, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the SWMS that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in SRP Section 11.4, NRC RGs, and industry standards. The staff concludes that the SWMS (as a permanently installed system and in combination with other plant systems) includes the equipment necessary to process liquid, wet, and dry solid wastes and contains provisions for controlling the release of radioactive materials in effluents in accordance with the requirements in 10 CFR 50.34a. The staff's review concludes that the SWMS is acceptable and meets the requirements in 10 CFR 50.34a and Section II.D of Appendix I to 10 CFR Part 50, as well as the guidance in RGs 8.8, 1.143, 1.109 and 1.110 and IE Bulletin 80-10. This conclusion is based on the following:

- Using site-specific conditions, the applicant met the ALARA criterion required in Section II.D of Appendix I to 10 CFR Part 50, because all associated effluent releases are expected to be managed through the operation of the LWMS and GWMS. The staff considered the potential effectiveness of augmenting the LWMS and GWMS using items of reasonably demonstrated technology. The staff determines that additional treatment is not expected to produce further reductions in collective population doses reasonably expected within an 80-kilometer (50-mile) radius of the reactor, at a cost of less than $1,000 per person-rem or person-thyroid-rem.

- The staff determines that the applicant adequately addressed the standard COL items regarding IE Bulletin 80-10 and 10 CFR 20.1406.

- The applicant's proposed PCP—as it relates to classifying, processing, and disposing of radioactive wastes—meets the requirements of 10 CFR Part 61. The staff concludes that the endorsement of NEI 07-10A, Revision 0, and the SWMS supplemental information in FSAR Section 11.4 are consistent with the requirements of GL 89-01.

11.5 Process Radiation Monitoring System

11.5.1 Introduction

The process radiation monitoring system (PRMS) is used to monitor liquid and gaseous process streams and effluent releases from the RWMS during normal operation, AOOs, and post-accident conditions. The systems include radiation monitors to detect and measure radioactivity and radiation levels and to provide indication of radioactive release rates or concentration levels in process and effluent streams. The PRMS include sampling systems to extract samples from process or effluent streams and to provide the means to collect samples on filtration and in adsorbent media. The PRMS provide the means to establish alarm set points for the purpose of indicating when excessive radioactivity levels are present, track and record rates of radioactivity releases, and initiate protective isolation actions, such as terminating or diverting process or effluent flows.

Typically, the system consists of skid-mounted radiation monitoring equipment and permanently installed sampling lines with the equipment being located at points to measure radioactivity or collect samples that are representative of process flows and effluent releases. Samples collected on filtration and in adsorbent media are evaluated by laboratory analyses in confirming measurement results recorded by radiation monitors and determining radioactivity levels associated with radionuclides that are not readily detected by radiation monitoring devices. The system includes local instrumentation readout panels and alarm functions in addition to those located in control rooms. The PRMS does not generate additional sources of radioactive materials associated with its operation given that it is used only to control and monitor liquid and gaseous process streams and effluents discharged to the environment. Fluid samples collected from process and effluent streams are returned to their origins and are not discharged locally.

11.5.2 Summary of Application

Section 11.5 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 11.5 of the certified ESBWR DCD, Revision 10. In addition, in FSAR Section 11.5, the applicant provides the following:

COL Items

- STD COL 11.5-1-A Sensitivities or Subsystem Lower Limit of Detection

This COL item addresses the derivation of lower limits of detection or detection sensitivity levels for each PRMS effluent subsystem, following the requirements of the ODCM for Fermi 3. The applicant states that the ODCM provides the methodology for deriving the lower limit of detection for each effluent monitor.

- STD COL 11.5-2-A Offsite Dose Calculation Manual

This COL item addresses the development of a plant- and site-specific ODCM for calculating offsite doses resulting from liquid and gaseous effluents. In FSAR Subsection 11.5.4.5, the

applicant incorporates by reference NEI 07-09A, Revision 0, “Generic FSAR Template Guidance for Offsite Dose Calculation Manual (ODCM) Program Description,” dated March 31, 2009 (ADAMS Accession No. ML091050234). The ODCM is used to control and monitor all liquid and gaseous effluent releases and to implement an environmental sampling and monitoring program. Section 13.4 of the Fermi 3 COL FSAR addresses the milestones for the development and implementation of the ODCM. In addition, the applicant commits (COM 11.5-001) to include in the ODCM the provisions for sampling liquid and gaseous waste streams identified in Table 11.5-201 and DCD Table 11.5-7 and batch liquid releases identified in DCD Table 11.5-7.

- STD COL 11.5-3-A Process and Effluent Monitoring and Sampling Program

This COL item addresses the implementation of a site-specific monitoring and sampling program, as described in the ODCM for Fermi 3. In addition, the applicant includes Table 11.5-201 as a replacement for Table 11.5-5 in ESBWR DCD, Tier 2, which details provisions for sampling liquid streams.

- STD COL 11.5-4-A Site-Specific Offsite Dose Calculation

This COL item addresses compliance with the design objectives in Appendix I to 10 CFR Part 50 for controlling doses to a hypothetical maximally exposed member of the public and populations living near Fermi 3.

- STD COL 11.5-5-A Instrumentation Sensitivities

This COL item addresses the derivation of instrumentation detection sensitivity levels and bases for sampling all expected liquid and gaseous effluent release points described in the ODCM for Fermi 3.

11.5.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is NUREG-1966. In addition, the relevant requirements of the Commission regulations for the PRMS, and the associated acceptance criteria, are in Section 11.5 of NUREG–0800.

The staff also followed the guidance in RG 1.206 to evaluate Section 11.5 of the Fermi 3 FSAR for compliance with NRC regulations.

In particular, the regulatory basis for acceptance of the additional information related to the PRMS appears in the following:

- 10 CFR 20.1301(e)
- 10 CFR 20.1302, “Compliance with dose limits for individual members of the public”
- 10 CFR 50.34a, “Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors”
- 10 CFR 50.36a, “Technical specifications on effluents from nuclear power reactors”

- Sections II.A, II.B, II.C, and II.D of Appendix I to 10 CFR Part 50

The following RGs and NRC documents contain regulatory guidance and position that may be used in demonstrating compliance with the relevant requirements of the regulations identified above:

- GL 89–01

Additional requirements include those of 10 CFR 50.34(f)(2)(xvii) and 10 CFR 50.34(f)(2)(xxvii) for monitoring gaseous effluents from potential accident release points, consistent with GDC 63 and 64.

SRP acceptance criteria include industry codes and standards, such as American National Standards Institute/Health Physics Society N13.1 and American Nuclear Society ANS N42.18, and the guidance in the following NRC documents:

- RG 1.109
- RG 1.110
- RG 1.21, Revision 1, “Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants,” June 1974
- RG 1.33, Revision 2, “Quality Assurance Program Requirements (Operation),” February 1978
- RG 1.97, Revision 4, “Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants,” June 2006
- RG 4.1, Revision 2, “Radiological Environmental Monitoring for Nuclear Power Plants,” June 2009
- RG 4.15, Revision 2, “Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination)—Effluent Streams and the Environment,” July 2007
- BTP 7-10, Revision 5, “Guidance on Application of Regulatory Guide 1.97,” issued March 2007, in SRP Section 7.5

11.5.4 Technical Evaluation

As documented in NUREG-1966, NRC staff reviewed and approved Section 11.5 of the certified ESBWR DCD. The staff reviewed Section 11.5 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to the PRMS.

In addition, the staff reviewed the applicant's proposed resolution to the COL items included under Section 11.5 of the Fermi 3 COL FSAR. The staff used the applicable sections of the SRP and RG 1.206 as guidance.

As stated above, Section 1.2.3 of this SER discusses the NRC's strategy for performing one technical review for each standard issue outside the scope of the design certification and to use this review to evaluate subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER for North Anna Unit 3 are equally applicable to the Fermi 3 COL application, the staff undertook the following reviews:

- The staff compared the North Anna Unit 3 COL FSAR, Revision 1, to the Fermi 3 COL FSAR, Revision 3. In performing this comparison, the staff considered changes to the Fermi 3 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the North Anna SER with open items.

- The staff confirmed that the applicant has endorsed all responses to the RAIs identified in the corresponding standard content evaluation (the North Anna SER).

- The staff verified that the site-specific differences are not relevant to this section of the Fermi 3 COL application.

The staff completed its review and found the evaluation of the North Anna standard content to be applicable to the Fermi 3 COL application. This SER identifies the standard content material with italicized, double-indented formatting.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

- STD COL 11.5-1-A Sensitivities or Subsystem Lower Limit of Detection

The following portion of this technical evaluation section is reproduced from Section 11.5.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091670733):

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

- *STD COL 11.5-1-A* *Sensitivity or Subsystem Lower Limit of Detection*

The COL item addresses the derivation of lower limits of detection for each effluent PRMS subsystem, following the requirements of the ODCM for North Anna 3. The applicant outlines, given the endorsement of NEI ODCM Template 07-09, methods used to derive the lower limits of detection for PRMS subsystems in monitoring and controlling liquid and gaseous effluent releases. The milestones for the development and implementation of the ODCM are addressed in FSAR Revision 1, Section 13.4 of the North Anna 3 COL. NRC staff finds this item satisfactorily addressed in FSAR Section 13.4, Table 13.4-201 (item 9), which lists the milestones for the development and implementation of the ODCM before fuel load, with the requirement identified as a license condition.

In Subsection 11.5.4.7 of the Fermi 3 COL FSAR, the applicant states that the ODCM will provide the methodology for deriving the lower limit of detection for the PRMS subsystem in monitoring and controlling liquid and gaseous effluent releases. DCD Tables 11.5-2 and 11.5-4 provide the estimated sensitivities of process radiation monitors. If the plant configuration and radiation background require changes to these sensitivity ranges, the ranges will be adjusted in accordance with written procedures consistent with the bases defined in DCD Table 11.5-9. The applicant will update the FSAR if changes to values in DCD Tables 11.5-2 and 11.05-4 are needed. The staff's review found that the applicant's response adequately addresses STD COL 11.5-1-A and the guidance in RGs 1.21, 1.33, 1.97, 1.206, 4.1, 4.15, and BTP 7-10 and complies with 10 CFR Part 20, 10 CFR Part 50.

- *STD COL 11.5-2-A* *Offsite Dose Calculation Manual*

The COL item addresses the development of a plant- and site-specific ODCM for calculating offsite doses resulting from liquid and gaseous effluents. FSAR, Section 11.5.4.5. The applicant endorses by reference NEI ODCM Template 07-09 as the basis of its ODCM as an operational program document. The NEI template presents the functional elements of an ODCM that, if met, would demonstrate compliance with Part 50.34a and 50.36a and Appendix I to 10 CFR Part 50. The NEI ODCM Template identifies monitoring criteria, liquid and gaseous radiological effluent controls, monitoring instrumentation, methods for deriving lower limits of detection and detection sensitivities, methods for establishing instrumentation alarm set-points, dose limits for members of the public, requirements for process and effluent sampling in various plant systems, requirements limiting effluent releases, surveillance requirements, methods for calculating effluent release rates and doses, elements of a radiological environmental monitoring program, elements of a quality assurance and quality control program, information to be contained in annual radiological effluent release reports, reporting requirements to the NRC, process for initiating and documenting changes to the North Anna 3 ODCM and supporting procedures, and record keeping. The NRC staff finds this item satisfactorily addressed in FSAR Section 13.4, Table 13.4-201 (item 9), which lists the milestones for the development and implementation of the ODCM before fuel load as a license condition. Accordingly, the applicant was requested, under RAI 11.05-1, to update the provisions of FSAR, Revision 0, Section 11.5.4.5,

(STD COL 11.5-2-A), by referencing NEI ODCM Template 07-09 in applicable FSAR subsections and references. In its response, the applicant proposed a revision to STD COL 11.5-2-A once the final NEI ODCM Template 07-09 is issued. The NEI ODCM Template 07-09A (Revision 0, March 2009) has been reviewed and found acceptable by the staff. The results of the staff's evaluation are presented in ML083530745 and the NEI ODCM Template 07-09A is presented in ML091460258. The staff finds the response acceptable, and this RAI is Confirmatory Item 11.05-1 until the applicant updates the reference to the final ODCM.

In Subsection 11.5.4.5 of the Fermi 3 COL FSAR, Revision 2, the applicant incorporates by reference the NEI 07-09A ODCM template as the basis of its ODCM. Therefore, Confirmatory Item 11.05-1 is resolved.

In addition, the applicant commits (COM 11.5-001) to include in the ODCM, before fuel load, the provisions for sampling liquid and gaseous waste streams identified in Table 11.5-201 and DCD Table 11.5-7 and batch liquid releases identified in DCD Table 11.5-7. Section 13.4, "Operational Programs Required by NRC Regulations," of the Fermi 3 COL FSAR addresses the milestones for developing and implementing the ODCM. In Table 13.4-201, the applicant identifies Commitment (COM 13.4-007), Commitment (COM 13.4-009) and Commitment (COM 13.4-010) to track license conditions for implementing milestones related to Commitment (COM 11.5-001).

The staff reviewed the applicant's Commitment (COM 11.5-001) to include provisions for sampling liquid and gaseous waste streams and batch liquid releases and found it acceptable. The staff designated Commitment (COM13.4-007), Commitment (COM 13.4-009), and Commitment (COM 13.4-010) as License Condition 11-2.

In FSAR Subsection 11.5.4.5, the applicant adds that the reactor water radioiodine concentrations will be maintained below the values in FSAR Table 12.2-206, in accordance with the ODCM. The staff noted that FSAR Table 12.2-205, not Table 12.2-206, provides the reactor water iodine radioisotope concentrations. After evaluating this change in SER Section 12.2.2, the staff issued RAI 12.02-7 asking the applicant to provide additional information on the proposed approach limiting reactor water iodine radioisotope concentrations, in accordance with the ODCM. The applicant's response to this RAI dated June 17, 2011 (ADAMS Accession No. ML11171A297), provides additional information and correctly references the radioiodine concentration limits in FSAR Table 12.2-205. The staff reviewed the proposed administrative control of radioiodine concentrations under the ODCM and found STD COL 11.5-2-A to be acceptable and in compliance with Sections II.A through II.C of Appendix I to 10 CFR Part 50.

- STD COL 11.5-3-A Process and Effluent Monitoring Program

This COL item addresses the development and implementation of a site-specific monitoring and sampling program described in the ODCM for Fermi 3. Section 13.4 of the Fermi 3 COL FSAR addresses the milestones for developing and implementing the radiological environmental monitoring program in Table 13.4-201 under Commitments COM 13.4-007 and 13.4 -009.

Subsection 11.5.4.6 of the Fermi 3 COL FSAR, Revision 0, on process and effluent monitoring and sampling presents information in Table 11.5-201 on sampling for several Fermi 3 plant systems, including the plant service water system (PSWS) (item 2), storm drains and cooling

tower blowdown (item 11), and sanitary wastewater (item 14). The staff reviewed the applicant's information on the Process and Effluent Monitoring Program listed in Table 12.5-201 and issued RAI 11.05-01, which noted internal data and footnote inconsistencies in Table 12.5-201 (in a comparison to DCD Table 11.5-5) on sampling for items 2, 11, and 14.

Under RAI 11.05-01, the staff asked the applicant to address the following observations:

a. Plant Service Water System (PSWS) (line item 2). For this system, footnotes 6 and 8 of Table 11.5-201 clarify sampling provisions and each sampling stream that would be treated through the LWMS. However, a review of MFN 06-417 Supplement 4, dated October 29, 2007 (ADAMS Accession No. ML073050178), indicates that in response to DCD RAI 9.2-8 S02, footnote 8 was replaced with footnote 4 in DCD Revision 5; however, Table 11.5-201 in the Fermi 3 COL FSAR does not reflect that change. Accordingly, the staff asked the applicant to update FSAR Table 11.5-201, line item 2, for the PSWS, to include the proper footnote citations. This information would ensure that such provisions are clearly identified in the FSAR and are not likely to be omitted during the development of the sampling and analysis program for the plant-specific ODCM in confirming compliance with the liquid effluent concentration limits of Table 2 (column 2) in Appendix B to 10 CFR Part 20 and the design objectives in Appendix I to 10 CFR Part 50.

   The applicant's response dated April 8, 2009 (ADAMS Accession No. ML091060496), modifies the entry in FSAR Table 11.5-201 for item 2 with the new title, "Service Water System and/or Circulating Water System." The response includes a new footnote 9 for item 2, which indicates that grab water samples can be obtained from the cooling tower basin (referring to FSAR Subsection 9.2.1.2 for the PSWS cooling tower basin and Subsection 10.4.5.2.3 for the circulating water system cooling tower basin). The staff reviewed this response and found it acceptable, with the inclusion of both the PSWS and the circulating water system and the new footnote 9 in item 2 of Table 11.5-201. Therefore, this portion of the RAI is resolved.

b. Storm Drains and Cooling Tower Blowdown (line item 11). For these two systems, footnote 4 of Table 11.5-201 does not refer to specific sampling provisions, such as sampling points or installation of automatic composite samplers. FSAR Sections 9.2, 10.4, and 11.5 do not appear to make such provisions for either system. Accordingly, the staff asked the applicant to confirm whether this observation is correct and update FSAR Sections 9.2, 10.4, and 11.5 by providing specific references to DCD or FSAR sections that present this information or, if not, by supplementing the appropriate FSAR sections with additional design details. This information would ensure that such provisions are clearly identified in the FSAR and are not likely to be omitted during the development of the sampling and analysis program for the plant-specific ODCM in confirming compliance with the liquid effluent concentration limits of Table 2 in Appendix B to 10 CFR Part 20 and the numerical objectives in Appendix I to 10 CFR Part 50.

   The applicant's response dated April 8, 2009, provides additional information and a revision to Table 11.5-201 item 11 by eliminating the cooling tower blowdown system from column 3 as an included ESBWR system. Furthermore, the applicant revised the footnotes by eliminating footnote 4 on general effluent monitoring and replacing it with a new footnote 10, which indicates that grab samples can be obtained from the condensate storage tank basin sump. The staff reviewed this response and found it

acceptable with the clarification of item 11 in Table 11.5-201, the elimination of footnote 4, and the inclusion of the new footnote 10. Therefore, this portion of the RAI is resolved.

c. Sanitary Waste Water System (line item 14). Footnote 4 of Table 11.5-201 does not refer to specific sampling provisions for this system. Therefore, the staff asked the applicant to add a new footnote to the system's line item 14 (column 3 in Table 11.5-201) indicating that grab samples can be obtained from the sewage treatment plant for the purpose of detecting the presence of radioactivity. This information would ensure that such provisions are clearly identified in the FSAR and are not likely to be omitted during the development of the sampling and analysis program for the plant-specific ODCM in confirming compliance with the liquid effluent concentration limits of Table 2 in Appendix B to 10 CFR Part 20 and the numerical objectives of Appendix I to 10 CFR Part 50.

The applicant's response dated April 8, 2009, revises the ESBWR system description in Table 11.5-201, item 14, from the "Sanitary Waste Water System" to the "Sanitary Waste Discharge System." In addition, the applicant deleted footnote 3, on batch-wise liquid waste processing; footnote 4, on general effluent monitoring; and footnote 6, defining the application of the provisions to systems that are not monitored, sampled, or analyzed before release. A new footnote 11, which indicates that grab samples can be obtained from the sewage treatment plant, replaced these deleted footnotes. The staff reviewed this response and found it acceptable, with the clarification of the sanitary waste discharge system, deletion of the previously cited footnotes, and the inclusion of the new footnote 11. Therefore, this portion of the RAI is resolved.

The staff verified that the applicant has incorporated the changes noted above in the Fermi 3 COL FSAR, Revision 1. Therefore, RAI 11.05-01 is resolved. In addition, STD COL 11.5-3-A is acceptable because it meets the guidance in RGs 1.21, 1.33, 1.97, 1.206, 4.1, 4.15, and BTP 7-10 and complies with 10 CFR Part 20, and 10 CFR Part 50.

- STD COL 11.5-4-A Site-Specific Offsite Dose Calculation

This COL item addresses compliance with the design objectives in Appendix I to 10 CFR Part 50 of controlling doses to a hypothetical, maximally exposed member of the public and populations living near Fermi 3. In Subsection 11.5.4.8 of the Fermi 3 COL FSAR, the applicant states that the ODCM addresses the guidelines in Appendix I to 10 CFR Part 50 and FSAR Section 12.2.2 provides the site-specific doses to members of the public. The staff's evaluation under COL Item STD COL 11.5-2-A provides further discussion on the ODCM, which is in compliance with Sections II.A through II.C of Appendix I to 10 CFR Part 50. The staff finds that the applicant's response adequately addresses this COL item and is therefore acceptable.

- STD COL 11.5-5-A Instrumentation Sensitivities

In Subsection 11.5.4.9 of the Fermi 3 COL FSAR, the applicant states that the ODCM will describe the instrument sensitivities, sampling, and analytical frequencies and the basis for each gaseous and liquid sample. The applicant references FSAR Subsection 11.5.4.5 for a discussion on the development and implementation of the ODCM. The staff's evaluation under COL Item STD COL 11.5-2-A provides further discussion on the ODCM (in terms of compliance with the guidance in RGs 1.21, 1.33, 1.97, 4.1, 4.15, and BTP 7-10 and complies with 10 CFR

Part 20, 10 CFR Part 50). The staff finds that the applicant's response adequately addresses STD COL 11.5-5-A and is therefore acceptable.

11.5.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the staff has identified the following license condition:

- License Condition (11-2) - At least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a), DTE Electric Company shall implement an operational program for process and effluent monitoring and sampling, including the following subprograms and documents:

  a. Radiological Effluent Technical Specifications/Standard Radiological Effluent Controls (COM 13.4-007)

  b. Offsite Dose Calculation Manual (COM 13.4-009)

  c. Radiological Environmental Monitoring Program (COM 13.4-010)

  No later than 12 months after issuance of the COL, the licensee shall submit to the Director of the NRO a schedule that supports planning and conducting NRC inspections of the operational program for process and effluent monitoring and sampling (including Radiological Effluent Technical Specifications/Standard Radiological Effluent Controls, the Offsite Dose Calculation Manual, and the Radiological Environmental Monitoring Program). The schedule shall be updated every 6 months until 12 months before scheduled fuel loading and every month thereafter, until the above operational program has been fully implemented.

11.5.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG-1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant addressed the required information related to the PRMS, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the PRMS that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in SRP Section 11.5, NRC RGs, and industry standards. The staff's review concludes that the applicant presented adequate information in the Fermi 3 COL FSAR to meet the requirements of the PRMS, which includes the equipment necessary to monitor process and effluent streams; describes an operational program to control releases of radioactive materials associated with the operation of the LWMS, GWMS, and SWMS; and incorporates provisions to implement a sampling and monitoring program. Furthermore, the staff concludes that the PRMS is acceptable and meets the requirements in 10 CFR 50.34a and Section II.D of Appendix I to 10 CFR Part 50, as well as the guidance of RGs 1.109 and 1.110 and IE Bulletin 80-10. This conclusion is based on the following:

- The PRMS includes the instrumentation for monitoring and sampling radioactivity in contaminated liquid and gaseous process and effluent streams and in solid wastes

during routine operations, AOOs, and accident conditions. The staff evaluated the proposed provisions for sampling and monitoring appropriate process streams and effluent release points, including nonradioactive systems that could become contaminated through interfaces with radioactive systems.

- The applicant's proposed development of the ODCM for Fermi 3, as it relates to controlling and monitoring effluent releases and doses to members of the public, meets the requirements of Appendix I to 10 CFR Part 50; 10 CFR 20.1301(e); and 10 CFR 20.1302. Therefore, the staff concludes that the endorsement of NEI 07-09A, Revision 0, and the PRMS supplemental information in FSAR Section 11.5 are consistent with GL 89-01.

12.0 RADIATION PROTECTION

This chapter provides information on radiation protection methods and estimated occupational radiation exposures to operating and construction personnel during both normal operations (including refueling; purging; fuel handling and storage; radioactive material handling, processing, use, storage, and disposal; maintenance; routine operational surveillance; inservice inspection [ISI]; and calibration) and anticipated operational occurrences (AOOs) (such as loss of power to all recirculation pumps, the tripping of the turbine generator set, isolation of the main condenser, and loss of offsite power). This chapter provides specific information on facility and equipment design, planning and procedures programs, and techniques and practices employed by the applicant to meet the radiation protection standards in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20, "Standards for Protection against Radiation"; and to be consistent with the guidance in the appropriate regulatory guides (RGs). The practices in those guides are used to implement the U.S. Nuclear Regulatory Commission (NRC) regulations.

12.1 Ensuring that Occupational Radiation Exposures Are as Low as Is Reasonably Achievable

12.1.1 Introduction

This combined license (COL) Final Safety Analysis Report (FSAR) section addresses policy and design considerations to ensure that the occupational radiation exposure (ORE) to personnel will be kept as low as is reasonably achievable (ALARA). The ALARA Program and Radiation Protection Program are addressed in Appendices 12AA and 12BB, respectively. The Fermi 3 COL FSAR adopts the following final versions of the Nuclear Energy Institute (NEI) generic templates accepted by the NRC: NEI 07–03A, "Generic FSAR Template Guidance for Radiation Protection Program Description," (Agencywide Documents Access and Management System (ADAMS) ML091490684) and NEI 07-08A, "Generic FSAR Template Guidance for Ensuring that Occupational Radiation Exposures are as Low as is Reasonably Achievable (ALARA),"(ADAMS Accession No. ML093220178).

12.1.2 Summary of Application

Section 12.1 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 12.1 of the certified Economic Simplified Boiling-Water Reactor (ESBWR) Design Control Document (DCD), Revision 10, referenced in 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix E, "Design Certification Rule for the Economic Simplified Boiling-Water Reactor." In addition, in FSAR Section 12.1, the applicant provides the following:

COL Items

- STD COL 12.1-1-A Regulatory Guide 8.10

The applicant is responsible for demonstrating compliance with the guidance of Regulatory Guide (RG) 8.10 Revision 1-R, "Operating Philosophy for Maintaining Occupational Radiation Exposures ALARA." The applicant references FSAR Appendices 12AA and 12BB, which in turn adopt NEI 07–08A and NEI 07–03A to meet the needs of this COL item.

- STD COL 12.1-2-A Regulatory Guide 1.8

The applicant is responsible for demonstrating compliance with the guidance of RG 1.8 Revision 3, “Qualification and Training of Personnel for Nuclear Power Plants.” The applicant references FSAR Appendices 12AA and 12BB, which in turn adopt NEI 07-08A and NEI 07-03A to meet the needs of this COL item.

- STD COL 12.1-3-A Operational Considerations

The applicant is responsible for providing criteria and conditions for implementing various operating procedures and techniques ensuring that occupational exposures are ALARA according to the guidance of NUREG–1736, “Consolidated Guidance: 10 CFR Part 20 — Standards for Protection Against Radiation.” The applicant references FSAR Appendices 12AA and 12BB, which in turn adopt NEI 07–08A and NEI 07–03A to meet the needs of this COL item.

- STD COL 12.1-4-A Regulatory Guide 8.8

The applicant is responsible for demonstrating compliance with the guidance of RG 8.8 Revision 3, “Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be ALARA.” The applicant references FSAR Appendices 12AA and 12BB, which in turn adopt NEI 07–08A and NEI 07–03A to meet the needs of this COL item.

Supplemental Information

- STD SUP 12.1-1 ALARA Program

The applicant provides supplemental information in FSAR Appendices 12AA and 12BB to address the ALARA Program and the Radiation Protection Program at the site. These appendices reference NEI 07–08A and NEI 07–03A, which in turn provide additional operating policy guidance for developing and implementing an ALARA program.

12.1.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966, “Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling Water Reactor Standard Design.”

The staff followed the guidance in RG 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition),” to evaluate Fermi 3 FSAR Section 12.1 for compliance with NRC regulations.

The relevant requirements of the Commission regulations for ensuring that occupational radiation exposures are ALARA, and the associated acceptance criteria, are in Section 12.1 of NUREG–0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, (LWR Edition),” the Standard Review Plan (SRP).

In particular, the regulatory basis for the acceptance of the COL items and the supplemental information is established in 10 CFR 19.12, “Instructions to workers”; 10 CFR Part 20, “Standards for Protection against Radiation”; and the guidance of RG 1.206; RG 8.10, Revision 1-R; RG 1.8, Revision 3; and RG 8.8, Revision 3.

Moreover, the acceptance of the COL items and the supplemental information in this section are based on guidance in the following RGs and NEI templates:

- RG 8.2, "Guide for Administrative Practices in Radiation Monitoring."
- RG 8.7, Revision 2, "Instructions for Record Keeping and Recording Occupational Radiation Exposure Data."
- RG 8.9, Revision 1, "Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program."
- RG 8.13, Revision 3, "Instruction Concerning Prenatal Radiation Exposure."
- RG 8.15, Revision 1, "Acceptable Programs for Respiratory Protection."
- RG 8.27, "Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants."
- RG 8.28, "Audible-Alarm Dosimeters."
- RG 8.29, Revision 1, "Instructions Concerning Risks from Occupational Radiation Exposure."
- RG 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses."
- RG 8.35, "Planned Special Exposures."
- RG 8.36, "Radiation Dose to the Embryo/Fetus."
- RG 8.38, Revision 1, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants."
- RG 1.206, NEI 07–03A, and NEI 07–08A.

12.1.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 12.1 of the certified ESBWR DCD. The staff reviewed Section 12.1 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to "Ensuring that Occupational Radiation Exposures are ALARA."

In addition, the staff reviewed the applicant's proposed resolution to the COL items and the supplemental information included under Section 12.1 of the Fermi 3 COL FSAR. In this review, the staff used the applicable sections of the SRP and RG 1.206 as guidance.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

Section 1.2.3 of this safety evaluation report (SER) discusses the NRC's strategy for performing one technical review for each standard issue outside the scope of the design certification (DC) and to use this review to evaluate the subsequent COL applications. To ensure that the staff's findings on the standard content that were documented in the SER with open items for the North Anna Unit 3 application are equally applicable to the Fermi 3 COL application, the staff undertook the following reviews:

- The staff compared the North Anna Unit 3 COL FSAR, Revision 1, to the Fermi 3 COL FSAR, Revision 3. In this comparison, the staff considered changes to the Fermi 3 COL FSAR (and other parts of the COL application, as applicable) resulting from requests for additional information (RAIs) and open and confirmatory items identified in the North Anna SER with open items.

- The staff confirmed that the applicant has endorsed all responses to the RAIs in the corresponding standard content (the North Anna SER) evaluation.

- The staff verified that the site-specific differences are not relevant to this section.

The staff completed the review and finds the evaluation of the North Anna standard content to be directly applicable to the Fermi 3 COL application. This SER identifies the standard content material with italicized, double-indented formatting.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

The following portion of this technical evaluation section is reproduced from Section 12.1.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL 12.1-1-A Regulatory Guide 8.10*

  The applicant provided additional information in STD COL 12.1-1-A to address the resolution of DCD COL Item 12.1-1-A, which states:

  "The COL applicant will demonstrate compliance with Regulatory Guide 8.10"

  The FSAR states that this COL information item is addressed in NEI Template 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description," which is referenced in Appendix 12BB of the FSAR. This template is currently under review by NRC staff.

  The staff reviewed the current version of NEI Template 07–03 with respect to compliance with RG 8.10. RG 8.10 describes the operating philosophy for maintaining occupational radiation exposures ALARA and states that the management of the licensed facility should be committed to maintaining exposures ALARA, and the personnel responsible for radiation protection should be continually vigilant for means to reduce exposures. NEI template 07–03 states that the plant management will establish a written policy on radiation protection that is consistent with the guidance in RG 8.10. The radiation protection responsibilities of the Radiation Protection Manager will be consistent

with the guidance in RG 8.10 and will include establishing, implementing, and enforcing the Radiation Protection Program. In addition, management is committed to assuring that each individual working at the facility understands and accepts the responsibility to follow radiation protection procedures and instructions provided by radiation protection staff and to maintain his or her dose ALARA.

As stated above, NEI Template 07–03 is still under staff review and, therefore, the staff cannot find the applicant's reference to this template to be acceptable until the staff completes the review of and approves this template, and the FSAR is updated by the applicant to reference the final version of this template. Since the template addresses the applicant's commitment to RG 8.10, the staff cannot consider DCD COL Item 12.1-1-A to be resolved until the staff approves this template. The applicant has committed to update the FSAR to reference the final version of this template when this template is approved by the staff. This is Confirmatory Item 12.01-1.

In Fermi 3 COL FSAR Revision 3, the applicant states that compliance with this RG is addressed in Appendices 12AA and 12BB, which in turn adopt NEI 07-08A and NEI 07–03A for meeting the needs of this COL item. NRC staff has reviewed and approved these NEI templates for addressing this COL item (ADAMS Accession Nos. ML090510379 and ML091130034). NEI 07–03A and NEI 07–08A are the final approved versions of NEI 07–03 and NEI 07–08 (ADAMS Accession Nos. ML091490684 and ML093220178, respectively). Therefore, the applicant has adequately addressed COL Item STD COL 12.1-1-A (compliance with the guidance of RG 8.10). Confirmatory Item 12.01-1 is closed.

The following portion of this technical evaluation section is reproduced from Section 12.1.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL 12.1-2-A Regulatory Guide 1.8*

  The applicant provided additional information in STD COL 12.1-2-A to address the resolution of DCD COL Item 12.1-2-A, which states:

  > *"The COL applicant will demonstrate compliance with Regulatory Guide 1.8."*

  The FSAR states that this COL information item is addressed in NEI Template 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description," which is referenced in Appendix 12BB of the FSAR.

  NRC staff has reviewed the current version of NEI Template 07–03 with respect to compliance with RG 1.8. RG 1.8 states that the American National Standards Institute (ANSI)/ American Nuclear Society (ANS)-3.1-1993, with certain additions, exceptions, and clarifications delineated in the RG, provides acceptable criteria for the selection, qualification, and training of personnel for nuclear power plants. NEI Template 07–03 states that the Radiation Protection Manager, Radiation Protection Technicians, and Radiation Protection Supervisory and Technical Staff will be trained and qualified in accordance with the guidance in RG 1.8. As stated above, NEI Template 07–03 is still under staff

review. Therefore, the staff cannot find the applicant's reference to this template to be acceptable until the staff completes the review and approves this template and the FSAR is updated by the applicant to reference the final version of the template. Since the template addresses the applicant's commitment to RG 1.8, the staff cannot consider DCD COL Item 12.1-2-A to be resolved until the staff approves this template. The applicant has committed to update the FSAR and reference the final version of this template when the template is approved by the staff. See Confirmatory Item 12.01-1.

In Fermi 3 COL FSAR, Revision 3, the applicant states that compliance with this RG is addressed in Appendices 12AA and 12BB, which in turn adopt NEI 07–08A and NEI 07–03A to meet the needs of this COL item. NRC staff reviewed and approved these NEI templates for addressing this COL item (ADAMS Accession Nos. ML090510379 and ML091130034). Therefore, the applicant has adequately addressed COL Item STD COL 12.1-2-A (compliance with the guidance of RG 1.8). Confirmatory Item 12.01-1 is closed.

The following portion of this technical evaluation section is reproduced from Section 12.1.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL 12.1-3-A Operational Considerations*

  The applicant provided additional information in STD COL 12.1-3-A to address the resolution of DCD COL Item 12.1-3-A, which states:

  > *"The COL applicant will provide the criteria and/or conditions under which various operating procedures and techniques will be implemented to ensure that occupational radiation exposures are ALARA using the guidance of NUREG–1736, to the level of detail provided in RG 1.206."*

  NRC staff reviewed the applicant's response to STD COL 12.1-3-A related to criteria and conditions under which various operating procedures and techniques will be implemented to ensure that occupational radiation exposures are ALARA, using the guidance in NUREG 1736 to the level of detail provided in RG 1.206. The staff also reviewed the applicant's response to ensure that the applicant has committed to follow the guidance in the following RGs: 8.2, 8.7, 8.9, 8.13, 8.15, 8.27, 8.28, 8.29, 8.34, 8.35, 8.36, and 8.38. The criteria and conditions in STD COL 12.1-3-A are addressed in NEI 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description," which is referenced in Appendix 12 BB of the FSAR. The template is currently under review by NRC staff.

  NEI 07–03 addresses various operating procedures and techniques used in dose-related activities found in typical nuclear plants. These activities include refueling, inservice inspections, radwaste handling, spent fuel handling, normal operations, routine maintenance, sampling, and calibration. The template allows for COL applicants to modify procedures based on design- and site-specific information. The staff reviewed the categories listed in the template for coverage of the ESBWR activities. On the basis of this review, the staff determined that NEI 07–03, as supplemented by material presented in the DCD, provides the criteria and/or conditions under which various operating procedures and

techniques will be implemented to ensure that occupational radiation exposures are ALARA. Since NEI 07–03 is still under staff review, the staff cannot find the applicant's reference to this NEI template to be acceptable until the staff completes the review and approves this template, and the FSAR is updated by the applicant to reference the final version of the template. Since the template addresses the applicant's resolution of DCD COL Item 12.1-3-A, the staff cannot consider DCD COL Item 12.1-3-A to be resolved until the staff approves the template. The applicant has committed to update the FSAR to reference the final version of the template when it is approved by the staff. See Confirmatory Item 12.01-1.

In Fermi 3 COL FSAR Revision 3, the applicant states that the operational considerations for the ALARA Program are addressed in Appendices 12AA and 12BB, which in turn adopt NEI 07-08A and NEI 07–03A to meet the needs of this COL item. NRC staff reviewed and approved these NEI templates for addressing this COL item in separate SERs (ADAMS Accession Nos. ML090510379 and ML091130034). Therefore, the applicant has adequately addressed COL Item STD COL 12.1-3-A (providing criteria and conditions for implementing various operating procedures and techniques to ensure that occupational exposures are ALARA, according to the guidance of NUREG–1736 to the level of detail in RG 1.206). Confirmatory Item 12.01-1 is closed.

The following portion of this technical evaluation section is reproduced from Section 12.1.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL 12.1-4-A Regulatory Guide 8.8*

The applicant provided additional information in STD COL 12.1-4-A to address the resolution of DCD COL Item 12.1-4-A, which states:

"The COL applicant will demonstrate compliance with Regulatory Guide 8.8."

The FSAR states that this COL information item is addressed in NEI template 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description," which is referenced in Appendix 12BB of the FSAR. NRC staff has reviewed the current version of NEI template 07–03 with respect to compliance with RG 8.8. This template, which is currently under review by the staff, addresses the operational portions of RG 8.8 that were not addressed in the ESBWR DCD, including a description of the plant organization, personnel, and personnel responsibilities; facilities (to the extent that they were not described in the DCD), instrumentation, and equipment. The template also includes a description of radiation protection procedures sufficient to provide adequate control over the receipt, possession, use, transfer, and disposal of byproduct, source, and special nuclear material and assure compliance with the applicable requirements in 10 CFR Parts 19, 20, 50, 70, and 71. The procedures described in this template include procedures for radiation protection training, access control of radiation areas, methods to maintain exposures ALARA, personnel monitoring, respiratory protection, and contamination control. Since NEI 07–03 is still under staff review, the staff cannot find the applicant's reference to this template to be acceptable until the staff completes the review and approves the template, and the FSAR is updated by the applicant to

reference the final version of the template. Since the template addresses the applicant's commitment to RG 8.8, the staff cannot consider DCD COL Item 12.1-4-A to be resolved until the staff approves the template. The applicant has committed to update the FSAR to reference the final version of the template. See Confirmatory Item 12.01-1.

In Fermi 3 COL FSAR Revision 3, the applicant states that compliance with this RG is addressed in Appendices 12AA and 12BB, which in turn adopt NEI 07–08A and NEI 07–03A to meet the needs of this COL item. NRC staff reviewed and approved these NEI templates for addressing this COL item (ADAMS Accession Nos. ML090510379 and ML091130034). Therefore, the applicant has adequately addressed COL Item STD COL Item 12.1-4-A (compliance with the guidance of RG 8.8). Confirmatory Item 12.01-1 is closed.

Supplemental Information

The following portion of this technical evaluation section is reproduced from Section 12.1.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD SUP 12.1-1 ALARA Program*

  STD SUP 12.1-1 of the North Anna COL FSAR references Appendices 12 AA and 12 BB for a description of the ALARA program. Appendix 12 AA refers to NEI 07–08, "Generic FSAR Template Guidance for Ensuring that Occupational Radiation Exposures Are As Low As Is Reasonably Achievable (ALARA)." Appendix 12 BB refers to NEI 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description. Both templates are currently under review by NRC staff.

  The staff reviewed current versions of NEI Templates 07–08 and 07–03 with respect to a description of the ALARA program. NEI template 07–08 states that company and station policies are to keep all radiation exposures of personnel within the limits defined by 10 CFR Part 20. The ALARA policy is consistent with and will be implemented in accordance with the ALARA provisions of RGs 8.8 and 8.10. As stated in FSAR Section 13.1, "Organizational Structure of Applicant," and in NEI template 07–03, specific individuals will be assigned the responsibility and authority for implementing the ALARA policy at North Anna 3. All station personnel are responsible for the ALARA program. Individual workers are responsible for complying with ALARA requirements, which are presented in worker training in accordance with the training requirements contained in 10 CFR 19.12. The extent of the training is commensurate with the worker's job responsibilities.

  North Anna's ALARA policies and practices are consistent with the applicable regulations in 10 CFR 20 and the guidance in RGs 1.8, 1.206, 8.2, 8.7, 8.8, 8.9, 8.10, 8.13, 8.15, 8.27, 8.28, 8.29, 8.34, 8.35, 8.36, and 8.38 and the applicable portions of NUREG–1736.

  The ALARA program is based on mature programs in use at other operating commercial nuclear facilities and incorporates lessons-learned from plant operating experience. Industry operating experience is regularly reviewed and applicable exposure control technique lessons-learned are incorporated into

plans, procedures, and policies developed in accordance with RGs 1.8, 8.8, and 8.10.

Overall facility operations, as well as the Radiation Protection Program, integrate the procedures necessary to ensure that radiation doses are ALARA. Radiation protection procedures, which are described in FSAR Section 12.5, are developed in FSAR Sections 13.5 and 17.5 and meet the applicable requirements in 10 CFR Parts 19, 20, 50, 70, and 71. Examples of some ALARA work practices incorporated in these procedures, and described in NEI template 07–08, to help ensure that exposures to personnel will be ALARA include use of:

- *Appropriate dosimetry to record personnel doses*
- *Pre-job briefings and post-job debriefings to ascertain lessons-learned*
- *Dry-run training and mockups to improve worker efficiency for complex jobs in high-radiation areas*
- *Protective clothing, respiratory equipment, and special ventilation systems for working in contaminated environments*
- *Remote monitoring of personnel to reduce worker exposures, and the establishment of low dose "waiting areas," and*
- *Permanent or temporary shielding to reduce worker exposure at the work site.*

As stated above, NEI templates 07–03 and 07–08 are still under staff review. Therefore, the staff cannot find the applicant's reference to these templates to be acceptable until the staff completes the review and approves the templates, and the FSAR is updated by the applicant to reference the final version of these templates. Since these templates provide a description of the applicant's ALARA program, the staff cannot consider the applicant's ALARA program to be acceptable until the staff approves this template. The applicant has committed to update the FSAR to reference the final version of these templates.

These are Confirmatory Items 12.01-1 (updating the FSAR to reference the final version of NEI template 07–03) and 12.01-3 (updating the FSAR to reference the final version of NEI template 07–08).

In Fermi 3 COL FSAR, Revision 3, the applicant provides supplemental information in Appendices 12AA and 12BB to address the ALARA Program and the Radiation Protection Program at the site. These appendices reference NEI 07–08A and NEI 07–03A, which provide additional operating policy guidance for developing and implementing an ALARA program. The applicant also provides site-specific information regarding access control in these appendices. The staff's evaluation of the site-specific information on access control is in Section 12.5 of this SER.

As stated earlier, NRC staff reviewed and approved these NEI templates for addressing the ALARA Program. Therefore, the applicant has adequately addressed the ALARA Program and

has identified the locations of very high radiation areas that require access control. Confirmatory Items 12.01-1 and 12.01-3 are closed.

12.1.5 Post Combined License Activities

There are no post COL activities related to this section.

12.1.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the relevant information, and no outstanding information is expected to be addressed in the Fermi 3 COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to "Ensuring that Occupational Radiation Exposures Are ALARA" that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in Section 12.1 of NUREG–0800, and other NRC RGs. The staff's review concludes that the applicant has adequately addressed STD COL Items 12.1-1-A through 12.1-4-A and, as described in the staff's evaluation above, the staff finds the information contained in STD SUP 12.1-1 acceptable. The applicant has also adequately incorporated by reference NEI 07–03A and NEI 07–08A, with additional site-specific information added to the COL FSAR. These NEI templates meet the acceptance criteria defined in Section 12.1 of NUREG–0800. Therefore, the staff determines that the information in this section adequately addresses an acceptable ALARA program and is in accordance with NRC requirements.

12.2 Plant Sources

12.2.1 Introduction

This FSAR section addresses the issues related to contained radiation sources and airborne radioactive material sources during normal operations, AOOs, and accident conditions affecting in-plant radiation protection.

This FSAR section also addresses doses to members of the public from radioactive effluent releases. All liquid effluent releases are conducted and monitored through the liquid waste management system (LWMS) for process liquids generated during the operation of the LWMS, the gaseous waste management system (GWMS), and the solid waste management system (SWMS). Airborne effluent releases are conducted and monitored from the operation of the LWMS, GWMS, and SWMS; and from the ventilation exhaust systems servicing radiologically controlled areas where process equipment are located. Airborne effluent release normally occur from the reactor/fuel building stack, the turbine building stack, and the radwaste building (RWB) stack.

12.2.2 Summary of Application

Section 12.2 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 12.2 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 12.2, the applicant provides the following:

Tier 2 Departure Not Requiring Prior NRC Approval

- EF3 DEP 11.4-1 Long-Term, Temporary Storage of Class B and C Low-Level Radioactive Waste

In this departure, the Fermi 3 RWB was reconfigured to accommodate a minimum 10-year volume of packaged Class B and C waste, while maintaining space for at least 3 months of packaged Class A waste. This reconfiguration results in changes to equipment location and layout. The applicant provides revised radiation source parameters in FSAR Table 12.2-22R.

COL Items

- EF3 COL 12.2-2-A Airborne Effluents and Doses

The applicant provides updated information to supplement the DCD with the site-specific parameters for addressing DCD COL Item 12.2-2-A, airborne effluent releases and doses to members of public. This information addresses compliance with the regulatory dose limits in Sections II.B and II.C of Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as Is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents"; to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"; compliance with Section II.D of Appendix I to 10 CFR Part 50; airborne effluent concentration limits in Table 2 (Column 1) of Appendix B, "Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage"; to 10 CFR Part 20; and dose limits in 10 CFR 20.1301, "Dose limits for the individual members of the public"; and 20.1302, "Compliance with the dose limits for individual member of the public." Compliance with the requirements in Section II.D of Appendix I to Part 50 for airborne effluents is addressed in FSAR Section 11.3.1.

- EF3 COL 12.2-3-A Liquid Effluents and Doses

The applicant provides updated information to supplement the DCD with the site-specific parameters for addressing DCD COL Item 12.2-3-A, liquid effluent releases and doses to members of public. This information addresses compliance with the regulatory dose limits in Section II.A of Appendix I to 10 CFR Part 50; Section II.D of Appendix I to Part 50; liquid effluent concentration limits in Table 2 (Column 2) of Appendix B to 10 CFR Part 20; and dose limits in 10 CFR 20.1301 and 20.1302. FSAR Section 11.2.1 addresses compliance with the requirements in Section II.D of Appendix I to Part 50 for liquid effluents.

- STD COL 12.2-4-A Other Contained Sources

The applicant includes Subsection 12.2.1.5, "Other Contained Sources," in the Fermi 3 FSAR. This subsection provides information about additional contained radioactive sources not described in the DCD that contain byproduct, source, or special nuclear materials that may be maintained onsite. These contained sources are not part of the permanent plant design; they are used as calibration, check, or radiographic sources.

Supplemental Information

- STD SUP 12.2-1

The applicant provides supplemental information in FSAR Subsection 12.2.1.1.2, "Other Radioactive Sources," to provide details regarding the Californium-252 (Cf-252) reactor startup source.

12.2.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the radiation sources, and the associated acceptance criteria, are in Section 12.2 of NUREG–0800.

The staff followed the guidance in RG 1.206 to evaluate Fermi 3 FSAR Section 12.2 for compliance with NRC regulations.

In accordance with Section VIII, "Processes for Changes and Departures," of "Appendix E to Part 52 -- Design Certification Rule for the Economic Simplified Boiling-Water Reactor," the applicant identifies one Tier 2 departure. Tier 2 departures not requiring prior NRC approval are subject to the requirements of 10 CFR Part 52, Appendix E, Section VIII.B.5, which are similar to the requirements of 10 CFR 50.59.

The regulatory bases for the acceptance of the COL items in this section include the applicable requirements of 10 CFR Part 20,10 CFR Part 50, and the guidance of RG 1.206.

In particular, the regulatory basis for the acceptance of the COL Items for assessing doses to members of the public from liquid and gaseous effluent releases in unrestricted areas is established in:

- 10 CFR 20.1301(e), 10 CFR 20.1302, 10 CFR 50.34a, and 50.36a.

- Appendix A, "General Design Criteria for Nuclear power Plants"; to 10 CFR Part 50 General Design Criterion (GDC) 60, "Control of releases of radioactive materials to the environment"; and GDC 64, "Monitoring radioactivity releases."

- Appendix I to 10 CFR Part 50, Sections II.A, II.B, II.C, and II.D.

The regulatory basis for the performance of the LWMS, GWMS, and SWMS is in 10 CFR 52.80(a) and Generic Letter (GL) 89–01, "Implementation of Programmatic and Procedural Controls for Radiological Effluent Technical Specifications."

SRP acceptance criteria include:

- RG 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I."

- RG 1.110, "Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors (for comment)."

- RG1.111, Revision 1, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors."

- RG 1.112, Revision 1, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors."

- RG 1.113, Revision 1, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," and RG1.206.

- Full descriptions of the applicable regulatory and acceptance criteria are in Section 11.2 through Section 11.4 of NUREG–0800.

12.2.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 12.2 of the certified ESBWR DCD. The staff reviewed Section 12.2 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to "Radiation Sources."

In addition, the staff reviewed the applicant's proposed departure and the proposed resolution to the COL items included under Section 12.2 of the Fermi 3 COL FSAR. The staff's review used the applicable sections of the SRP and RG 1.206 as guidance. The staff performed an independent evaluation of doses from liquid and gaseous effluents using the LADTAP II computer code (NUREG/CR–1276, "User's Manual for LADTAP II – A Computer Program for Calculating Radiation Exposure to Man from Routine Release of Nuclear Reactor Liquid Effluents") and the GASPAR II computer code (NUREG/CR–4653, "GASPAR II – Technical Reference and User Guide"). The staff reviewed the basis for the liquid and gaseous effluents source terms and the applicant's assumptions and data used to model exposure pathways and to estimate doses to offsite receptors.

Section 1.2.3 of this SER discusses the NRC's strategy for performing one technical review for each standard issue outside the scope of the DC and to use this review to evaluate the subsequent COL applications. To ensure that the staff's findings on the standard content that were documented in the SER with open items for the North Anna Unit 3 application are equally applicable to the Fermi 3 COL application, the staff undertook the following reviews:

- The staff compared the North Anna Unit 3 COL FSAR, Revision 1, to the Fermi 3 COL FSAR, Revision 3. In this comparison, the staff considered changes to the Fermi 3 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the North Anna SER with open items.

- The staff confirmed that the applicant has endorsed all responses to the RAIs in the corresponding standard content (the North Anna SER) evaluation.

- The staff verified that the site-specific differences are not relevant to this section.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

The staff completed the review and f the evaluation of the North Anna standard content to be directly applicable to the Fermi 3 COL application. This SER identifies the standard content material with italicized, double-indented formatting.

The staff reviewed the following information in the Fermi 3 COL FSAR:

Tier 2 Departure Not Requiring Prior NRC Approval

- EF3 DEP 11.4-1 Long-Term, Temporary Storage of Class B and C Low-Level Radioactive Waste

The Fermi 3 RWB was reconfigured to accommodate a minimum 10-year volume of packaged Class B and C waste, while maintaining space for at least 3 months of packaged Class A waste. This reconfiguration results in changes to equipment location and layout. The applicant provides revised radiation source parameters in FSAR Table 12.2-22R. The staff reviewed the equipment location and compared FSAR Table 12.2-22R with DCD Tier 2 Table 12.2-22. This comparison confirmed that the radiation source parameters remained unchanged, except for sources in DCD Rooms 6171 and 6172, which are now located in the reconfigured FSAR Room 6171. In the new configuration, the equipment drain sample tank and floor drain sample tank will be in one room (FSAR Room 6171). These tanks were originally in two separate rooms (DCD Rooms 6171 and 6172). A review of DCD Figure 12.3-19 and FSAR Figure 12.3-19R revealed that FSAR Room 6171 has a larger overall area than the two DCD rooms (6171 and 6172) combined. The staff therefore concluded that given the size of Room 6171, the radiation level and the required shielding will remain the same as those identified for Rooms 6171 and 6172 in the DCD, regardless of the tank locations.

The applicant's evaluation determined that this departure does not require prior NRC approval in accordance with 10 CFR Part 52, Appendix E, Section VIII.B.5. Within the review scope of this section, the staff finds it reasonable that the departure does not require prior NRC approval. The applicant's process for evaluating departures and other changes to the certified ESBWR DCD is subject to NRC inspections.

COL Items

- EF3 COL 12.2-2-A Airborne Effluents and Doses

This COL item updates estimated airborne (gaseous) effluents source term, and associated doses to the public. The information and analyses address compliance with Sections II.B and II.C of Appendix I to 10 CFR Part 50; gaseous effluent concentration limits in Table 2 (Column 1) of Appendix B to 10 CFR Part 20; and requirements of 10 CFR 20.1301 and 20.1302. Several tables in the FSAR present updated site information compared to the ESBWR DCD, Tier 2, Revision 9. The FSAR presents an estimate of the annual gaseous effluents source term by radionuclides and results demonstrating compliance with gaseous effluent concentration limits of Appendix B to Part 20. The FSAR also presents dose results that demonstrate compliance with Sections II.B and II.C of Appendix I to 10 CFR Part 50. Compliance with the U.S. Environmental Agency (EPA) standard in 40 CFR Part 190, "Environmental Radiation Protection Standards For Nuclear Power Operations," as implemented under 10 CFR 20.1301(e), is presented in FSAR Tables. Compliance with the EPA standard in 40 CFR Part 190, as implemented under 10 CFR 20.1301(e), will be described just before the discussion of COL Item EF3 COL 12.2-3-A, as well as the results demonstrating compliance with Sections II.A of Appendix I to Part 50. Compliance with Section II.D of

Appendix I to 10 CFR Part 50 on ALARA is discussed in FSAR Section 11.3 for gaseous effluents, as evaluated in SER Section 11.3. The staff's evaluations concerning this gaseous effluent information and resulting compliance are discussed below.

Gaseous Effluents Source Term/10 CFR Part 20 Compliance

Gaseous Effluents Source Term Determination Summary

The estimated gaseous effluents source term is based on the information in ESBWR DCD, Tier 2, Section 12.2.2. Although the ESBWR design has three plant stacks (the reactor/fuel building stack, the turbine building stack, and the RWB stack), the applicant assumes that all releases will occur from a single stack with each receptor assumed to be at the nearest location from the proposed plant (see the staff's evaluations in Section 2.3.5 of this SER for details). Several tables in ESBWR DCD, Tier 2, Revision 9, present information normally incorporated from the DCD into the FSAR to represent the gaseous effluents source term. DCD Tier 2, Tables 12.2-15 and 12.2-16 present the input effluent release data and the output airborne (gaseous) release source term in terms of curies per year based on the method in NUREG-0016 Revision 1, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Boiling Water Reactors (BWR-GALE CODE)." However, the gaseous effluent doses predicted from the ESBWR DCD, Tier 2, Table 12.2-16 source term indicate that the resultant design exposure could exceed the design basis 10 CFR Part 50 guidance, as seen in ESBWR DCD, Tier 2, Table 12.2-18b for the maximally exposed individual (MEI) critical organ during a calendar year. The gaseous effluents source term estimates in ESBWR DCD, Tier 2, Table 12.2-16 are based on the pumped forward configuration of the ESBWR feedwater heater drains that bypass the condensate demineralizer cleanup system, thus increasing the concentration of radionuclides in the gaseous effluents and the corresponding effluent doses. In order to alleviate this increase in radionuclide activity, which leads to an increase in the gaseous effluents source term, the applicant made changes in the FSAR. FSAR Subsection 12.2.2.1 states that in accordance with FSAR Subsection 11.5.4.5 and the Fermi 3 offsite dose calculation manual (ODCM), compensatory methods are implemented (such as realigning from a pumped forward to a cascade operating configuration so that 100 percent of the radionuclides are treated by the condensate demineralizer) to ensure that the estimated dose to the MEI critical organ is less than 0.15 millisievert (mSV) (15 milliroentgen equivalent man [mrem]). Gaseous effluent rates will be maintained by limiting the radioiodine concentrations in the reactor water to those prescribed in FSAR Table 12.2-205, which were determined using the methodology in DCD Section 11.1, "Source Terms." The annual airborne radioiodine effluent releases in FSAR Table 12.2-206 are then determined from the reactor water radioiodine concentrations in FSAR Table 12.2-205. The final normal operating annual gaseous effluents source term is therefore a combination of the values in FSAR Table 12.2-205 for the radioiodine isotopes and in DCD Tier 2, Table 12.2-16 for all radionuclides, except the radioiodine isotopes.

Gaseous Effluents Source Term Details

The staff reviewed the applicant's information on the operational method to limit the reactor water radioiodine concentrations. The staff noted that the applicant has proposed an alternative methodology to achieve the bounding dose objectives of the certified ESBWR design. The cited radioiodine concentrations in FSAR Table 12.2-205 correspond to an operating condition consistent with 100 percent flow through the condensate demineralizer, which is higher than the percentage used in the certified ESBWR design of 66.3 percent (0.663). Therefore, the staff Issued RAI 12.02-7 with the following items and requesting the applicant to provide additional information relative to the proposed revisions to the FSAR:

1. The discussion refers to NUREG–0016 methodology, as referenced by the DCD, and upon which the staff's review was based, as "overly conservative." However, this characterization and the corresponding operational limitations proposed do not provide a quantification of the asserted conservatism. Please provide this information in sufficient detail for the staff to quantify the effect on effluent concentrations and resultant public doses, and occupational doses to in-plant workers.

2. The NUREG–0016 methodology is used for all boiling-water reactor (BWR) design applications. The proposed revision does not provide an alternative methodology, instead appearing to assert the conservatism as a justification for not providing an alternative methodology. Please provide an alternative methodology, including quantifiable changes to input, clarifying your quantification and technical basis for this statement; or provide information to support the deviation from the routine source term in Chapter 11.1 of the DCD, and resulting calculations of effluents.

3. The description of the condensate purification system in the ESBWR DCD was changed such that the purification flow went from 100 percent to about 67 percent of condensate flow. This resulted in an increase to the calculated routine source term. FSAR Revision 3 proposes to reduce calculated doses by reducing the source term back to the values calculated in the design before the change in the description. The applicant proposes to accomplish this through operational limitations, such that purification flow would be 100 percent of condensate flow. This proposal, however, does not address the revised power level to account for the loss of efficiency in the thermal cycle. Further, the proposal does not quantify the differences to the routine and accidental source terms from prolonged operation at the reduced power levels. Please clarify whether this proposed operational limitation will be stated in the ODCM, or will be proposed as a license condition to satisfy 10 CFR Part 50, Appendix I.

4. The resulting calculated MEI and population doses provided in FSAR Revision 3 do not appear to be fully consistent with the revised release concentrations in the ESBWR DCD. Please provide additional information regarding the effect of these changes on the information presented in Tables 12.2-17R, 12.2-18bR, 12.2.201, 12.2.203, and 12.2-204 of the FSAR, including operation at the expected reduced thermal efficiencies consistent with the proposed operational limitation.

The applicant's response to this RAI dated June 17, 2011 (ADAMS Accession No. ML11171A297), provided additional clarifying statements on the proposed changes. The applicant reiterated the statement in DCD Tier 2, Subsection 12.2.2.2, that the COL applicant is responsible for ensuring that the offsite dose (using site-specific parameters) due to radioactive airborne effluents complies with the regulatory dose limits in 10 CFR Part 50, Appendix I, Sections II.B and II.C. Also, the applicant noted that the staff's Final SER (FSER) on ESBWR DCD, (NUREG–1966), Chapter 2 states that:

> Other parameters, such as releases rates, can also be adjusted to demonstrate compliance with 10 CFR Part 50, Appendix I, dose criteria.

The applicant added that preliminary dose calculations using the gaseous effluents source term in DCD Tier 2, Table 12.2-16 indicate that the estimated exposure to the Fermi 3 MEI critical organ during a calendar year could exceed 0.15 mSv (15 mrem) (ADAMS Accession No. ML102510498). To limit the potential MEI critical organ dose below the regulatory limit, the applicant chose to lower the iodine release rate (consistent with the staff's statement) by placing

administrative limits on the reactor water iodine radioisotope concentrations during normal operations at levels indicated in FSAR Table 12.2-205. The applicant stated that the values in Table 12.2-205 were developed consistent with DCD Section 11.1 using the methodology described in ANSI/ANS-18.1–1999, "Radioactive Source Term for Normal Operation of Light Water Reactors." The applicant references Regulatory Position C.4 of RG 1.112, Revision 1 and the staff's ESBWR DCD FSER Chapter 11 (NUREG–1966), thus indicating the acceptability of the ANSI/ANS-18.1–1999 methodology as an alternative to the NUREG–0016 methodology.

Furthermore, the applicant added that the limits established in Table 12.2-205 were developed with the assumption that the plant was operating in a cascade configuration (i.e., 100 percent of the steam flow is treated by the condensate demineralizer). In the supplemental response to RAI 12.02-7 dated August 5, 2011 (ADAMS Accession No. ML11221A075), the applicant stated that the ESBWR DCD does not describe the maximum capabilities of the condensate purification system (CPS) or the condensate system components (i.e., pumps, valves, and pipes). The maximum component capabilities were established during the detailed design. Therefore, the applicant added Supplemental Information EF3 SUP 10.4-1 and EF3 SUP 10.4-2 in FSAR Subsections 10.4.6.2.2 and 10.4.7.2.1, respectively, to ensure that the CPS and the condensate system components design can accommodate 100 percent of the feedwater flow to support the cascade configuration.

The staff reviewed the applicant's response and confirmed the reactor water iodine radioisotope concentrations in Table 12.2-205 through an independent confirmatory calculation. The applicant's use of the ANSI/ANS-18.1–1999 methodology is consistent with the guidance of RG 1.112, Regulatory Position C.4, and the staff's review of ESBWR DCD Chapter 11. Therefore, the applicant's approach through the two site-specific supplements (EF SUP 10.4-1 and EF SUP 10.4-2) is acceptable, because it ensures that the CPS and condensate components design will have the capability for a 100-percent feedwater flow to support a cascade configuration.

In response to Item 1, the applicant states that the characterization of the conservative nature of NUREG–0016 is based on experience operating BWRs. The reactor water iodine concentrations at operating BWRs are lower than the values determined using the NUREG-0016 methodology. However, because this method was not used to determine the iodine source terms, the discussion of the conservative nature of NUREG–0016 will be removed from FSAR Subsection 12.2.2.1. The staff finds the applicant's response is acceptable, and RAI 12.02-7, Item 1 is resolved.

In response to Item 2, the applicant states that ANSI/ANS-18.1–1999 was used as an alternative methodology to the NUREG–0016 method. The use of ANSI/ANS-18.1–1999 is consistent with the guidance in RG 1.112 and the NRC FSER on the ESBWR DCD (NUREG-1966). The iodine releases in FSAR Table 12.2-206 were developed using the reactor water radioiodine concentrations in FSAR Table 12.2-205 and the method described in DCD Tier 2, Appendix 12B. The applicant notes that clarifying statements will be added to FSAR Subsection 12.2.2.1 specifying the method used to develop normal operating radioiodine limits and releases in FSAR Tables 12.2-205 and 12.2-206, respectively. Therefore, the applicant's response is acceptable, because the applicant used acceptable methods described in ANSI/ANS-18.1–1999 to determine the iodine radioisotope concentrations and releases. RAI 12.02-7, Item 2 is resolved.

The applicant's response to Item 3 states that Fermi 3 will operate in a pumped forward configuration, when the normal operating reactor water radioiodine concentrations are less than

the concentration limit values in FSAR Table 12.2-205. If the radioiodine concentrations reach the values in Table 12.2-205, the unit will operate in the cascade configuration. In this configuration, all of the condensed steam is routed to the condenser and then treated by the condensate demineralizer, thus resulting in a small power reduction due to the loss of thermal efficiency. The applicant adds that this action does not replace the design-basis reactor water radioiodine concentrations in DCD Tier 2, Table 11.1-4a. This action results in the continued operation of Fermi 3 at lower reactor water radioiodine concentrations compared to the limits for the normal ESBWR operational radioiodine values. The reactor water radioiodine concentrations listed in FSAR Table 12.2-205 are administrative limits controlled through the ODCM, as indicated in FSAR Subsection 11.5.4.5. The staff finds the applicant's response reasonable, because operating at higher reactor water radioiodine concentrations than those cited in FSAR Table 12.2-205 will result in a Fermi 3 MEI critical organ dose that exceeds the regulatory dose limit. The applicant imposes an administrative control through the ODCM to limit the Fermi 3 MEI critical organ dose below the regulatory dose limit. Therefore, RAI 12.02-7, Item 3 is resolved.

The applicant's response to Item 4 states that as described earlier in response to the Environmental Report (ER) RAI 01-1 dated September 1, 2010 (ADAMS Accession No. ML102510498), and in the responses to the above items, limiting the maximum allowable radioiodine concentrations in the reactor water ensures that the MEI critical organ dose will be less than the regulatory limit. The information in FSAR Tables 12.2-17R, 12.2-18bR, 12.2-203, and 12.2-204 is based on the gaseous release values in FSAR Table 12.2-206 for radioiodine and in DCD Table 12.2-16 for releases other than iodine radionuclide isotopes. The staff finds the applicant's response acceptable. As indicated earlier, to ensure that the MEI doses will not exceed the regulatory limits of Appendix I to 10 CFR Part 50, the applicant must limit the iodine releases during normal operation. One method for achieving this is to maintain the reactor water iodine radioisotope concentrations at levels lower than the normal ESBWR DCD operational radioiodine values. The applicant is committed to limiting the normal operating radioiodine concentrations in the reactor water to the values listed in FSAR Table12.2-205. This concentration limit will be controlled through the ODCM. The staff finds the applicant's response acceptable, and RAI 12.02-7, Item 4 is resolved. Therefore, this RAI 12.02-7 is closed.

10 CFR Part 20 Compliance

Based on this revised source term (i.e., values in DCD Tier 2, Table 12.2-16 and in FSAR Table 12.2-206), the applicant in FSAR Table 12.2-17R provides the list of radionuclide airborne effluents; their annual release quantities; and the comparison of airborne effluent release concentrations with the 10 CFR Part 20 concentration limits. This information addresses compliance with the regulatory airborne effluent concentration limits in Table 2 (Column 1) of Appendix B to 10 CFR Part 20.

The staff's review of the Fermi 3 FSAR Revision 0 identified an incorrect presentation of the estimated gaseous effluent concentrations at the site boundary, for compliance with the concentration limits in 10 CFR Part 20, Appendix B, Table 2 (Column 1). In RAI 12.02-1, the applicant was requested to revise FSAR Table 12.2-17R and to add a column to this table showing the ratio of each radionuclide to the corresponding limits in Appendix B to 10 CFR Part 20. In the response to this RAI dated April 8, 2009 (ADAMS Accession No. ML091060496), the applicant revised the gaseous effluent concentrations at the site boundary. The applicant also incorporated this response into Revision 1 of the Fermi 3 COL

FSAR dated March 2009. The staff finds that the applicant's response correctly presents the requested information and is in compliance with 10 CFR Part 20, Appendix B, Table 2 (Column 1). Therefore, RAI 12.02-1 is closed and resolved.

Gaseous Effluent Doses

DCD COL Item 12.2-2-A directs the applicant to provide a site-specific estimate of airborne effluents and associated doses to the public. The site-specific information and analyses address compliance with Sections II.B and II.C of Appendix I to 10 CFR Part 50. Several tables in FSAR Section 12.2.2 present updated gaseous effluents dose information compared to ESBWR DCD, Tier 2, Revision 9. The revised tables in the Fermi 3 FSAR are Tables 12.2-18aR and 12.2-18bR, which present results that demonstrate compliance with Sections II.B and II.C of Appendix I to 10 CFR Part 50.

In a change from Section 12.2.2 of the ESBWR DCD, Tier 2, the applicant applied site-specific information and assumptions to assess the radiological impacts on members of the public. The staff reviewed the proposed updates, information, and commitments identified in FSAR Subsections 12.2.2.1 and 12.2.2.2. The staff performed independent evaluations of offsite doses from gaseous effluents using the GASPAR II computer code; the applicant's basis for the gaseous effluents source term; and assumptions and data used to model exposure pathways to estimate doses to offsite receptors. The gaseous effluents source term is based on ESBWR DCD Section 12.2.2. For gaseous effluents, the exposure pathways include an external exposure to the airborne plume; an external exposure to ground-deposited radioactivity; the inhalation of airborne radioactivity; and the ingestion of food products containing radioactivity. The applicant identified locations of expected maximum exposures that included the nearest site boundary and nearest residence garden, and consumption of meat and milk from beef cattle.

In RAI 12.02-3, the staff requested the applicant to provide the input and output files for the data used in the GASPAR II computer code analyses to generate dose estimates to the public that are associated with the operation of Fermi 3. The applicant was specifically asked to describe all assumptions and bases for the use of factors that are different from the default values noted in RG 1.109, Revision 1, and/or the GASPAR II code. In the response to this RAI dated August 25, 2009 (ADAMS Accession No. ML092580311), the applicant provided the GASPAR II site-specific input parameters and their bases in addition to the electronic input and output files. The staff reviewed the applicant's response and performed confirmatory analyses to determine the gaseous pathway doses to the MEI and to the general population residing within an 80-kilometer (km) (50-mile [mi]) radius of the site. The staff confirmed the gaseous pathway doses in FSAR Tables 12.2.18bR and 12.2-201(for the MEI) and Table 12.204 (for the 80-km [50-mi] population). These results indicate that the projected annual doses to the MEI from gaseous effluents comply with the regulatory dose limits in 10 CFR Part 50, Appendix I, Sections II.B and II.C. In addition, the projected gaseous effluent 80-km (50-mi) population doses would be insufficient to result in any cost-beneficial gaseous radwaste augments per the guidance in RG 1.110. Therefore, RAI 12.02-3 is resolved.

Table 12-1 of this SER compares the applicant's results to the staff's confirmatory results and to the 10 CFR Part 50, Appendix I gaseous dose design objectives. This table shows that the applicant's results and the staff's confirmatory results are below the Appendix I criteria. The staff performed independent confirmatory assessments on the latest FSAR Table 12.2-18bR gaseous effluent data. The staff concluded that the applicant has demonstrated compliance with the gaseous effluent regulatory requirements in 10 CFR Part 20 and Appendix I to 10 CFR Part 50.

Table 12-1 Comparisons of Annual Doses per unit to the Maximally Exposed Individual from Gaseous Effluents

Type of Dose	Application*	NRC Staff's Analysis	10 CFR Part 50, Appendix I
Beta Air mGy/yr(mrad/yr) [at the Site Boundary]	2.59E-3 (2.59E-1)	2.59E-3 (2.59E-1)	1.00E-1 (1.00E+1)
Gamma Air mGy/yr (mrad/yr) [at the Site Boundary]	2.18E-3 (2.18E-1)	2.18E-3 (2.18E-1)	2.00E-1 (2.00E1)
Whole Body [includes plume exposure] mSv/yr (mrem/yr)	9.76E-3 (9.76E-1)	8.38E-3 (8.38E-1)	5.00E-2 (5.00E+0)
Skin [includes plume exposure] mSv/yr (mrem/yr)	1.15E-2 (1.15E+0)	1.15E-2 (1.15E+0)	1.50E-1 (1.50E+1)
Iodines & Particulates- Max Organ Thyroid mSv/yr (mrem/yr)	1.13E-1 (1.13E+1)	1.21E-1 (1.21E+1)	1.50E-1 (1.50E+1)

* FSAR Table 12.2.-201
mGy = milligray; 1 mGy = 100 mrad; rad = radiation absorbed dose; yr=year
mrem = milliroentegn equivalent man
mSv = millisievert; 1 Sv = 100 rem

Population Dose Evaluation – Gaseous Effluents

The applicant calculated a collective whole body dose from gaseous effluents to a population of 7.71 million within an 80-km (50-mi) radius of the site. This calculation included a description of the exposure pathways that could transmit radiation and radioactive effluents to the population within the 80-km (50-mi) radius of the site. The applicant considered the following exposure pathways to evaluate the population dose: immersion in a radioactive plume, a direct radiation exposure from deposited radioactivity, inhalation of airborne radioactivity, ingestion of garden fruits and vegetables, and ingestion of meat and milk.

Table 12-2 of this SER lists the applicant's calculated population collective doses (in terms of the total body dose and the thyroid dose). NRC staff independently verified the applicant's population dose input values and gaseous effluent population doses. The cumulative population exposure was determined for annual gaseous effluent releases and then used to determine cost-beneficial gaseous radwaste augments per the guidance in RG 1.110 in FSAR Section 11.3. This regulatory guidance assesses the potential reductions in the cumulative exposure to the population using augments to the proposed gaseous radwaste systems in a cost-benefit analysis calculation. These calculations are performed to demonstrate compliance with Section II.D of Appendix I to Part 50.

Table 12-2 Annual Population Doses from Gaseous Effluents

Type of Dose	Application*
Total Body	6.70E-2 (6.70E+0)
Thyroid	2.70E-1 (2.70E+1)
* FSAR Table 12.2-204 All doses are in person-Sv/yr (person-rem/yr)	

10 CFR 20.1301(e), (40 CFR Part 190) Liquid and Gaseous Effluent Dose Compliance

10 CFR 20.1301(e) requires NRC-licensed facilities to comply with "the provisions of EPA's generally applicable environmental radiation standards of 40 CFR Part 190" for all facilities that are part of the fuel cycle. The EPA annual dose limits are 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid, and 0.25 mSv (25 mrem) to any other organ. Compliance with 10 CFR 20.1301(e) requires the consideration of all potential sources of external radiation and radioactivity, including total doses from liquid and gaseous effluents and external radiation exposures from buildings, storage tanks, radioactive waste storage areas, and radioactive nitrogen-16 (N-16) sky shine (radiation from the interaction of N-16 with the air molecules reflected back to the ground) from BWR turbine buildings. The EPA standards apply to the entire site or facility, whether it has a single unit or multiple units.

The staff reviewed FSAR Chapter 11 for compliance with 10 CFR 20.1301(e) and EPA general radiation protection standard 40 CFR Part 190.

The applicant's comparison of site doses in FSAR Table 12.2-203 includes the sum of the actual current liquid and gaseous effluent doses from the operating unit at the site, plus the liquid and gaseous effluent doses projected from a new unit. This table accounts for liquid and gaseous effluent site dose contributions.

The staff determined the site dose as the combined doses from the effluent dose information in FSAR Table 12.2-201 for the annual gaseous effluent doses to the MEI, the information in FSAR Table 12.2-202 for the annual doses to the MEI from Fermi 3 liquid effluents, and the annual individual doses for the liquid and gaseous effluents from the Fermi 2 operation. In addition, the staff considered the direct dose to the nearest site resident from the Fermi 2 independent spent fuel storage installation (ISFSI). Based on the ISFSI dose rate of 6.64×10^{-3} mrem per hour (mrem/hr) at a distance of 252 meters (m) (820 feet [ft]), as provided in Section 12.4.4 of this SER, the staff estimated the direct annual dose to the nearest site boundary to be about 10 mrem/yr. This dose is added to the whole body site dose in FSAR Table 12.2-203 and is compared to the 40 CFR Part 190 dose limit. This total dose must be less than the dose limits in 40 CFR Part 190. As indicated in Table 12-3 below, the total site doses are less than the limits and are therefore acceptable.

Table 12-3 Comparisons of Annual Maximally Exposed Individual Doses in 10 CFR 20.1301(e) and 40 CFR Part 190

Type of Dose	FERMI 3 Liquid	FERMI 3 Gaseous	FERMI 2 Existing Unit**	Direct Radiation	Total	10 CFR 20.1301 and 40 CFR Part 190 Limits
Total Body Applicant	6.48E-5 (6.48E-3)	9.76E-3 (9.76E-1)	4.68E-2 (4.68E+0)	1.00E-1 (1.00E+1)	1.57E-1 (1.57E+1)	2.5E-1 (2.5E1+)
Organ/Body Applicant	8.77E-4 (8.77E-2)	1.15E-3* (1.15E-1)	5.20E-4 (5.20E-2)	1.00E-1 (1.00E+1)	1.23E-1 (1.23E+1)	2.5E-1 (2.5E+1)
Thyroid Applicant	2.63E-4 (2.63E-2)	1.13E-1 (1.13E+1)	2.66E-2 (2.66E+0)	1.00E-1 (1.00E+1)	2.40E-1 (2.40E+1)	7.5E-1 (7.5E+1)

* Skin dose;
** Sum of gaseous and liquid effluent doses
All doses are in mSv/yr (mrem/yr)

On the basis of the information in FSAR Subsection 12.2.2.1, the staff finds that the applicant adequately addresses COL Item EF3 COL 12.2-2-A regarding the description of gaseous effluents and associated doses from the Fermi 3 ESBWR. Therefore, DCD COL Item 12.2-2-A is resolved.

- EF3 COL 12.2-3-A Liquid Effluents and Doses

This COL item updates estimated liquid effluents and associated doses to the public. The revised information and analyses address compliance with Section II.A of Appendix I to Part 50, liquid effluent concentration limits in Table 2 (Column 2) of Appendix B to Part 20, and requirements of 10 CFR 20.1301 and 20.1302. Several FSAR tables present updated site information compared to the information in ESBWR DCD, Tier 2, Revision 9. The FSAR presents an estimate of the annual liquid effluents source term by radionuclides and results demonstrating compliance with liquid effluent concentration limits of Appendix B to Part 20. Compliance with the EPA standard in 40 CFR Part 190, as implemented under 10 CFR 20.1301(e), is presented in FSAR tables in addition to the results demonstrating compliance with Sections II.A of Appendix I to Part 50. Compliance with Section II.D of Appendix I to Part 50 on ALARA is addressed in FSAR Section 11.2. The staff's evaluations of the liquid effluents information and resulting compliance are described below.

Liquid Effluents Source Term/10 CFR Part 20 Compliance

Liquid Effluents Source Term Determination Summary

The liquid effluents source term is based on the information in ESBWR DCD, Tier 2, Section 12.2.2. The applicant states that the plant has the capability of recycling 100 percent of the liquid radwaste and intends to operate Fermi 3 with zero liquid effluent releases. However, the applicant provides potential liquid pathway doses to address compliance with the regulatory dose limits in Section II.A of Appendix I to 10 CFR Part 50. Several tables in the

FSAR present information incorporated from ESBWR DCD, Tier 2, Revision 9, to represent the liquid effluents source term.

FSAR Table 12.2-19bR presents an estimate of the annual liquid effluents source term by radionuclides and concentration results that demonstrate compliance with the liquid effluent concentration limits of Appendix B to 10 CFR Part 20. The staff identified an inconsistency in the applicant's data showing compliance with 10 CFR Part 20, Appendix B, Table 2 (Column 2). In RAI 12.02-2, the staff requested the applicant to update the FSAR by listing the liquid discharge nuclide concentrations in a tabular format and showing the comparisons with the corresponding values in Table 2 of Appendix B to 10 CFR Part 20 for consistency with the unity rule. In the response to this RAI dated August 8, 2009 (ADAMS Accession No. ML091060496), the applicant revised Table 12.2-19bR to include a comparison with the unity rule. This response was incorporated into Revision 1 of the FSAR dated March 2009. The staff reviewed the applicant's response and found it acceptable. This response was based on the liquid effluent source term from DCD Revision 5.

In March 2010, the applicant issued COL FSAR Revision 2. However, FSAR Table 12.2-19bR did not list the correct liquid effluents source term from DCD Revision 7. The staff verified that FSAR Revision 3 still did not list the correct liquid effluents source term from DCD Revision 9. In the supplemental response to RAI 12.02-2 dated August 1, 2011 (ADAMS Accession No. ML1121A021), the applicant provided the revised Table 12.2-19bR incorporating the annual liquid effluents source term consistent with DCD Revision 9. The staff finds this response acceptable, and RAI 12.02-2 is therefore resolved and closed.

The staff notes that FSAR Tables 12.2-19aR and 12.2-19bR are consistent with DCD Tables 12.2-19a and 12.2-19b representing the GALE-86 computer code (NUREG–0016) input parameters and the resulting average annual liquid effluent release quantities per year. Table 12.2-19bR contains the liquid effluent discharge nuclide concentrations and comparisons to the corresponding values in Table 2 of Appendix B to 10 CFR Part 20 for consistency with the unity rule. The staff's review of this table finds the information to be consistent with the corresponding DCD tables, and it is therefore acceptable.

Liquid Effluent Doses

This COL item updates estimated liquid effluents and associated doses to the public. The revised information and analyses address compliance with Section II.A of Appendix I to Part 50. FSAR Tables12.2-20aR and 12.2-20bR present results that demonstrate compliance with Sections II.A of Appendix I to Part 50.

In a change from Section 12.2.2 of the ESBWR DCD, Tier 2, the applicant applied site-specific information and assumptions to assess the radiological impacts on the public. The staff reviewed the proposed updates, information, and commitments in FSAR Subsection 12.2.2.4. The staff performed independent evaluations of offsite doses from liquid effluents using the LADTAP II computer code, the applicant's basis for the liquid effluent source term, and assumptions and data used to model exposure pathways and to estimate doses to offsite receptors. The exposure pathways include ingestion of aquatic food, ingestion of drinking water, exposure to shoreline sediment, and exposure to water through boating and swimming.

As part of the review, the staff identified a number of issues requiring the clarification and correction of specific technical and regulatory topics. Therefore, the staff asked the applicant to provide additional information to resolve these issues.

In RAI 12.02-4, the staff requested the applicant to provide the input and output files or the data used in the LADTAP II computer code analyses to generate dose estimates to the public associated with the operation of Fermi 3. Specifically, the applicant was asked to:

a. Provide justification for transit times and dilution factors used in LADTAP II code dose calculations for liquid effluent discharges at different intake locations (commercial fish and invertebrate catch locations, drinking water intake locations). Also, provide a discussion describing the impact of thermal variations on applied dilution factors.

b. Provide estimates of the amount of invertebrate stocks caught from waters within 50 miles downstream of the facility's radwaste discharge line that is consumed locally and regionally.

c. Provide discussions describing local wildlife game, plants, agricultural practices, game harvests, and food processing operations having the potential to contribute 10 percent or more to either individual or population doses in areas affected by liquid effluents, such as irrigation, livestock watering, and food-processing operations, involving local and regional water use.

d. Describe all assumptions and basis for the use of factors that are different than the default values noted in RG 1.109 and/or LADTAP II code.

The applicant responded to this RAI in a letter dated August 25, 2009 (ADAMS Accession No. ML092580311).

In response to Part a, the applicant provides transit time and dilution factors for drinking water and fish and invertebrate harvests used to consider the impacts of thermal variations in Lake Erie. The applicant used the CORMIX computer program (Jirka, G.H., R.L. Doneker, and S.W. Hinton, "User's Manual for CORMIX: A Hydrodynamic Mixing Zone Model and Decision Support System for Pollutant Discharges into Surface Waters," developed for U.S. Environmental Protection Agency, Office of Science and Technology, 2007) to determine dilution in Lake Erie; provide monthly total dilution factors; and compare the average annual dilution factor with that used in liquid effluent dose calculations. For the drinking water, the overall dilution factor (blow down dilution multiplied by Lake Erie dilution) ranged from 6,930 to 10,240, with an average value of 8,914; versus 7,705 used by the applicant for dose calculations. For the fish and invertebrates harvest, the overall dilution factor ranged from 8,880 to 10,823, with an average value of 10,172; versus 11,500 used by the applicant. Therefore, the dilution factors and transit times provided are utilized in the liquid effluent dose evaluations and the impact of the thermal variations were considered for drinking water and fish and invertebrate harvests.

In response to Part b, the applicant states that even though there is currently no commercial fishery for invertebrates in the Great Lakes, it was conservatively assumed that the invertebrate caught in the Great Lakes is similar to that in salt water sites. The total catch was therefore based on total invertebrate consumption within the 80-km (50-mi) radius of the site using the projected 80-km (50-mi) radius population for the year 2060, and the LADTAP II default child/teen/adult population fractions and their corresponding invertebrate consumption values in Table E-5 of RG 1.109, Revision 1.

In response to Part c, the applicant states that the estimate for the quantities of invertebrates harvest presented in Part b bounds any recreational harvesting operation. The applicant adds

that the ER in Part 3 of the COL application provides surface water usage for drinking water, irrigation, and livestock consumption from the Lake Erie. These data indicate that potable water usage is more than eight times that of the other uses. In addition, the consumptive surface water usage from the western basin of Lake Erie—in the local area of Monroe County for irrigation and livestock—is small. Furthermore, there are no food processing operations utilizing large quantities of water from the western basin of Lake Erie. Therefore, surface water usage for irrigation and livestock would not provide significant means for contributing 10 percent or more to either the individual or to the public dose due to local animal meats, plant agricultural practices, and game harvests.

In response to Part d, the applicant provides the LADTAP II site-specific and generic input values and bases and electronic input and output files.

The staff reviewed the applicant's responses to Parts b through d. As indicated in FSAR Table 12.2-20bR, the MEI liquid release doses from ingesting fish and invertebrates accounts for well over 90 percent of the total MEI dose for both adults and children. Drinking water adds to the balance of the total body dose for both age groups. Therefore, potential doses from using surface water for irrigation and animal consumption would be small.

In the response to Part a, the staff noted that the applicant's dilution factors used for the drinking water and fish and invertebrate harvests were not conservative. Therefore, two LADTAP confirmatory runs were conducted to determine the impact of dilution factors on the MEI and population doses. One run used the applicant's assumption on dilution factors, and the other used the minimum overall dilution factor. In the second confirmatory run, the Lake Erie dilution factor was adjusted to correspond to the minimum overall dilution factors. The dose results from this run indicate an increase of about 29 percent in the total body dose and the maximum organ dose for an MEI; and about a 30 percent increase among the population in the total body dose and the maximum organ dose. As indicated in FSAR Table 12.2-203 in the comparisons MEI doses to the regulatory dose limits, offsite liquid effluent doses are smaller by about 2 to 3 orders of magnitude. Because the baseline MEI dose is very small and complies by a wide margin with the regulatory dose limit in 10 CFR Part 50, Appendix I, Section II.A, the additional 30 percent increase in the baseline liquid effluent dose estimates is negligible. With respect to the population dose, the 30 percent increase in the offsite liquid effluent dose would not change the conclusion that none of the liquid radwaste augments would be cost-beneficial. Also in response to Part c, the applicant stated that there is little use of surface water for irrigation or livestock. Therefore, an increase in the baseline dose estimate by 30 percent would not increase the estimated doses and conclusions. This analysis was based on the DCD Revision 5 liquid effluents source term.

In FSAR Revision 2, the applicant used the DCD Revision 6 liquid effluents source term. The liquid effluents source term remained unchanged in DCD Revision 7 and thereafter. The staff reviewed the updated doses to the MEI and the population. The staff performed confirmatory analyses to determine the liquid effluent pathway doses to the MEI and to the 80-km (50-mi) radius population. The analyses confirmed the applicant's liquid effluent pathway dose results in FSAR Revision 2, Tables 12.2-20bR, 12.2-202, 12.2.203, and 12.2.204. The applicant's response to supplemental RAI 12.02-2 dated August 1, 2011 (ADAMS Accession No. ML1121A1021), revised Table 12.2-19bR to be consistent with the annual liquid release using DCD Revision 9, Table 12.2-19b.

Table 12-4 of this SER compares the applicant's results to the staff's confirmatory results and to the 10 CFR Part 50, Appendix I liquid dose design objectives. This table shows that the

applicant's results and the staff's confirmatory results are below the Appendix I criteria. The staff also performed independent confirmatory assessments of the latest FSAR Table 12.2-19bR liquid effluent data. The staff concluded that the applicant has demonstrated compliance with the liquid effluent regulatory requirements in 10 CFR Part 20 and Appendix I to 10 CFR Part 50. Therefore, RAI 12.02-4 is closed and resolved.

Table 12-4 Comparisons of Annual Maximally Exposed Individual Doses per unit from Liquid Effluents

Type of Dose	Application*	NRC Staff's Analysis	10 CFR Part 50, Appendix I, Section II.A
Total Body	6.48E-5 (6.48E-3)	6.53E-5 (6.53E-3)	3.0E-2 (3.0E+0)
Thyroid	2.63E-4 (2.63E-2)	2.40E-4 (2.40E-2)	1.0E-1 (1.0E+1)
Bone (Adult)	8.77E-4 (8.77E-2)	8.41E-4 (8.41E-2)	1.0E-1 (1.0E+1)
* FSAR Table 12.2.-202 All doses are in mSv/yr (mrem/yr)			

Population Dose Evaluation – Liquid Effluents

The applicant calculated a collective whole body dose from liquid effluents to a population of 7.71 million, within an 80-km (50 mi) radius of the site. This calculation included a description of the exposure pathways that could transmit radiation and radioactive effluents to the public within the 80-km (50-mi) radius of the site. The applicant used the information for the ingestion of fish and invertebrates, exposure to shoreline sediments, ingestion of drinking water, and exposure to water while swimming and boating.

Table 12-5 of the SER provides a comparison of the applicant's calculated population collective doses (in terms of the total body dose and the thyroid dose) and the staff's independently calculated results. The results in this table show that the applicant's assumptions and parameters resulted in approximately the same total body and thyroid doses as those in the NRC staff's independent assessment. The cumulative population exposure was determined for annual liquid effluent releases and then used to determine cost-beneficial liquid radwaste augments, per the guidance in RG 1.110 in FSAR Section 11.2. This regulatory guidance assesses the potential reductions in the cumulative exposure to the population using augments to the proposed liquid radwaste systems in a cost-benefit analysis calculation. These calculations were performed to demonstrate compliance with Section II.D of Appendix I to 10 CFR Part 50.

Table 12-5 Comparison of Annual Population Doses from Liquid Effluents

Type of Dose	Application*	NRC Staff's Analysis
Total Body	1.49E-1 (1.49E+1)	1.46E-1 (1.46E+1)
Thyroid	3.01E-1 (3.01E+1)	2.04E-1 (2.04E+1)
* FSAR Table 12.2-204 All doses are in person-Sv/yr (person-rem/yr)		

On the basis of the information described above, the staff finds that the applicant adequately addresses COL Item EF3 COL12.2-3-A (a description of site-specific liquid effluent releases and doses to members of the public). Therefore, DCD COL Item 12.2-3-A is resolved.

The following portion of this technical evaluation section is reproduced from Section 12.2.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL 12.2-4-A Other Contained Sources*

  The applicant provided additional information under STD COL 12.2-4-A that addresses the resolution of DCD COL Item 12.2-4-A, which states:

  > *"The COL applicant will address any additional contained radiation sources (including sources for instrumentation and radiography) not identified in Subsection 12.2.1.5."*

  The COL applicant stated that additional contained sources which contain by-product, source, or special nuclear materials may be used and maintained on site. These sources are typically used as calibration or radiography sources. In response to staff RAI 12.02-6, the applicant stated that, in addition to use as calibration and radiography sources, the contained sources described in Subsection 12.2.1.5 will also be used as check sources. The staff finds this response acceptable and RAI 12.02-6 is closed.

  Calibration sources will be used to calibrate the process and effluent radiation monitors, the area radiation monitors, and portable and laboratory radiation detectors and radiation measurement instruments. All calibration sources will be traceable to the National Institute of Standards and Technology, or equivalent. Radiography sources will be surveyed upon entry to the site and radiation protection personnel will maintain copies of the most recent leak test records for owner-controlled sources. Radiography will be conducted in accordance with approved procedures. Check sources, which are not necessarily calibrated, are used to confirm the continuing satisfactory operation of an instrument. In response to staff RAI 12.02-8, the applicant stated that check sources, which are an integral part of (i.e., physically located in) area, process, and effluent monitors and are not easily removed, do not require special handling, storage, or use procedures for radiation protection purposes.

Since these check sources consist of small quantities of by-product material and since access to these sources would require procedures and tools to disassemble components of the monitors, the staff finds this response acceptable and RAI 12.02-8 is closed. Except for check sources physically located in monitors, as described above, and exempt quantities or concentrations of solid and liquid sources used for instrument calibration, the applicant stated that Radiation Protection Program procedures will be used to govern the use and control of these additional contained radiation sources. The applicant stated that these procedures will consider guidance provided in RG 8.8 to ensure that occupational doses from the control and use of these sources are ALARA.

In addition, Section 12.5.4.10 of NEI template 07–03, referenced in the North Anna 3 COL FSAR Section 12.5, describes Radiation Protection Program radioactive material control procedures. This section states that procedures will be established, implemented, and maintained to ensure compliance with the relevant requirements in 10 CFR Part 20 to ensure positive control over licensed radioactive material to avoid unnecessary or inadvertent exposures and releases of such material into uncontrolled areas in a manner that is not authorized by regulation or the license. In response to staff RAI 12.02-5, the applicant verified that these procedures will apply to byproduct, source, and special nuclear material, including the contained sources described in Subsection 12.2.1.5. The staff finds this response acceptable and RAI 12.02-5 is closed.

RG 1.206 states that the applicant should describe any required radiation sources containing byproduct, source, and special nuclear material that may warrant shielding considerations, and, for any such sources, should provide a listing by isotope, quantity, form, and use for all of these sources that exceed 3.7 E+9 Bq (100 millicuries). The staff issued RAI 12.02-7 and asked the applicant to ascertain whether any of the contained sources described in Subsection 12.2.1.5 met these criteria. In response to this RAI, the applicant stated that FSAR Appendix 12BB (which incorporates by reference NEI template 07–03) addresses shielding requirements for all byproduct, source, and special nuclear material, including the portable sources described in Subsection 12.2.1.5. The applicant stated that two standard calibration sources that exceed 3.7 E+9 Bq (100 millicuries) will be purchased. Details of isotope type, quantity, form, shielding requirements, and use of future contained sources will be available when these required sources are purchased. Because these sources will be controlled by the applicant's Radiation Protection Program, the staff finds this response acceptable and RAI 12.02-7 is closed.

On the basis of the information provided in Subsection 12.2.1.5 of the FSAR, the staff finds that the applicant has adequately addressed DCD COL Item 12.2-4-A regarding the description of any other contained radiation sources not described in Subsection 12.2.1.5 of the ESBWR DCD. Therefore, the staff finds DCD COL Item 12.2-4-A to be resolved.

As stated above, the applicant's radioactive material control procedures (which are part of the Radiation Protection Program) will apply to byproduct, source, and special nuclear materials. In order to obtain a description of the specific types of byproduct, source, and special nuclear

materials (including their chemical or physical forms and maximum quantities held at any one time) for the requested material licenses under 10 CFR Part 30, “Rules of General Applicability to Domestic Licensing of Byproduct Material”; 10 CFR Part 40, “Domestic Licensing of Source Material”; and 10 CFR Part 70, “Domestic Licensing of Special Nuclear Material”; the staff issued RAI 01-7 (ADAMS Accession No. ML113120325). In the response to this RAI dated December 7, 2011 (ADAMS Accession No. ML11343A014), the applicant amended FSAR Subsection 12.2.1.5 to provide a description of the byproduct, source, and special nuclear material that will be received; possessed; or used during the period between the issuance of the COL and the 10 CFR 52.103(g) finding.

In FSAR Subsection 12.2.1.5, the applicant states that no 10 CFR Part 40 specifically licensed material—including natural uranium, depleted uranium, or uranium hexafluoride—will be received; possessed; or used during the period between the issuance of the COL and the 10 CFR 52.103(g) finding. Pursuant to 10 CFR Part 30, the applicant amended the FSAR to provide a description of the nominal values of projected radioactive byproduct materials (in the form of sealed sources) that will be used for radiation monitoring and laboratory and portable monitoring instrumentation. This information is in FSAR Table 12.2-208 the applicant verified that no byproduct material will be received, possessed, or used in a physical form that is “in unsealed form, on foils or plated sources, or sealed in glass,” and that exceeds the quantities in Schedule C in 10 CFR 30.72, “Schedule C–Quantities of radioactive materials requiring consideration of the need for an emergency plan for responding to a release.” The applicant stated that special nuclear material shall be in the form of reactor fuel and spent fuel, in accordance with limitations for storage and amounts required for reactor operation as described in COL application Part 2. Pursuant to 10 CFR Part 70, the applicant amended the FSAR to provide a description of the non-fuel special nuclear material specifically required for use at Fermi 3. This non-fuel special nuclear material consists of local power range monitor assemblies and startup range nuclear monitor assemblies. This information is listed in FSAR Table 12.2-209. The applicant verified that the special nuclear material to be received, possessed, or used does not involve enriched uranium for which a criticality accident alarm system is required; uranium hexafluoride in excess of 50 kilograms (110 pounds) in a single container or 1,000 kilograms (2,200 pounds) total; or plutonium in excess of 2 curies in an unsealed form or on foils or plated sources. The staff finds that the specific material information described above satisfies the requirements of 10 CFR 30.32, “Application for specific licenses”;.10 CFR 40.31, “General domestic licenses for byproduct material”; 10 CFR 70.21, “filing”; and 10 CFR 70.22 “Contents of applications,” to receive; possess; and use byproduct, source, and special nuclear material. Therefore, this information is acceptable.

In addition, as part of the Fermi 3 review of plant-specific information on other contained sources under COL Item STD COL 12.2-4-A, the staff issued RAI 12.03-12.04-8 requesting the applicant to describe the condensate storage tank (CST) and its expected location at the Fermi site. The RAI also requested the applicant to provide information on the CST’s expected maximum radionuclide inventory, maximum dose rate at 30 centimeters (cm) (1 ft) from the outside surface, and radiation zone classification. The staff also requested the applicant to identify any physical or administrative features that will be incorporated to limit the access to the CST to ensure that radiation exposure to personnel who are in the vicinity of the tank is ALARA.

In the response to this RAI dated October 19, 2010 (ADAMS Accession No. ML102940218), the applicant provided the requested information including a description of the CST location, projected CST design dimensions, and the estimated radionuclide inventory of the CST based on the various potentially contaminated liquid inputs into the tank. The applicant amended the

FSAR to include a new table (Table 12.2-207), which lists the estimated radionuclide source term concentrations and source term inventories in the CST. The applicant stated that the primary source of water to the CST is purified and demineralized water from the makeup water system. This source of water to the CST does not contain contaminants. However, the CST can receive potentially radioactive recycled water from the control rod drive (CRD) system; treated water from the LWMS; and condensate reject from the condenser (in cases where the water level in the condenser is too high).

To establish a bounding source term, the applicant assumed that the main sources contributing to the buildup of radioactivity in the CST are condensate-reject from the condenser and treated water from the LWMS (the applicant did not consider the contribution of recycled water from the CRD system because this water has the same activity level as that of the CST). The applicant compared the expected radionuclide concentrations in the condenser with those in the equipment drain sample tank of the LWMS (the treated water from the LWMS is stored in the equipment drain sample tank before being recycled to the CST). The applicant selected the largest value as the bounding activity in the CST. The ESBWR DCD states that the capacity of the CST is 4,885 cubic meters (1.29 million gallons). The ESBWR DCD does not provide any further design parameters for the CST, so the applicant considered two different CST design configurations based on tank aspect ratios of 0.5 and 2 that limit the tank diameter and height. Based on these tank configurations, the applicant calculated the potential dose rate at 30 cm (1 ft) from the surface of the tank to be 2.2 mrem/hr for the shorter tank (aspect ratio of 2) and 2.1 mrem/hr for the taller tank (aspect ratio of 0.5). Because these estimated dose rates are below the threshold considered to be a radiation area per 10 CFR 20.1003, the applicant concluded that no special physical or administrative features are needed to maintain the exposures ALARA in the vicinity of the CST.

The staff reviewed the applicant's information, assumptions, and the method of analysis and found them acceptable. The staff performed confirmatory analyses to determine the potential radionuclide concentrations in the CST and the expected dose rates in the vicinity of the CST. The staff's analyses confirmed the applicant's cited results. Therefore, RAI 12.03-12.04-8 is closed. The staff verified that the FSAR Revision 4 includes the revised Table 12.2-207, which provides a list of the bounding radionuclide inventory in the CST.

Overall, the staff finds that the applicant's resolution of COL Item STD COL 12.2-4-A meets the requirements of 10 CFR Part 20 and is therefore acceptable.

Supplemental Information

- STD SUP 12.2-1

As described above, in the applicant's initial response to RAI 01-7, dated December 7, 2011 (ADAMS Accession No. ML11343A014), the applicant added Tables 12.2-208 and 12.2-209 to the Fermi FSAR. Table12.2-209, "Non-Fuel Special Nuclear Material for Use," included a listing for the CF-252 reactor startup source and classified it as being 10 CFR Part 70 non-fuel special nuclear material. In a supplemental response to RAI 01-7, dated June 28, 2013 (ML13183A145), the applicant reclassified Cf-252 as 10 CFR Part 30 byproduct material and removed the listing of CF-252 from FSAR Table 12.2-209. The applicant then added STD SUP 12.2-1 at the end of Subsection 12.2.1.1.2. STD SUP 12.2-1 specifies the quantity of Cf-252 that will be in sic CF-252 sealed sources required for reactor startup. This supplemental information relating to the material description of the Cf-252 reactor startup

source satisfies the requirements of 10 CFR 30.32, “Application for specific licenses,” and, therefore, the staff finds STD SUP 12.2-1 to be acceptable. Therefore, this RAI 01-7 is closed and resolved.

12.2.5 Post Combined License Activities

There are no post COL activities related to this section.

12.2.6 Conclusion

The NRC staff’s finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff’s review confirms that the applicant has addressed the relevant information relating to plant radiation sources, and no outstanding information is expected to be addressed in the Fermi 3 COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the radiation sources that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in Section 12.2 of NUREG–0800, and other NRC RGs. The staff’s review concludes that the applicant has adequately addressed the COL item involving contained sources by providing a description of the contained sources that were not described in the ESBWR DCD. The applicant stated that these sources would be used as calibration, check, or radiographic sources. The applicant also stated that the procedures used to govern the control and use of these contained sources considers the guidance in RG 8.8. The staff’s review also concludes that the applicant has adequately addressed the COL items involving liquid and gaseous effluent releases and doses to the public. The results of the dose assessment analyses and estimates of offsite liquid and gaseous effluent concentrations are acceptable and meet the applicable requirements of 10 CFR 20.1301, 20.1302, and 20.1301(e); 10 CFR Part 50, Appendix I design and ALARA objectives; and effluent concentration limits of Appendix B, (Table 2) to 10 CFR Part 20. Finally, as discussed in the staff’s evaluation above, the staff finds the information in STD SUP 12.2-1 acceptable.

12.3 Radiation Protection Design Features

12.3.1 Introduction

This FSAR section addresses the issues related to radiation protection equipment and design features used to ensure that occupational radiation exposures are ALARA. The discussion takes into account design dose rates, AOOs, and accident conditions. These issues include the facility design features, shielding, ventilation, area radiation and airborne radioactivity monitoring instrumentation, and dose assessment.

12.3.2 Summary of Application

Section 12.3 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 12.3 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 12.3, the applicant provides the following:

Tier 2 Departure Not Requiring Prior NRC Approval

- EF3 DEP 11.4-1 — Long-Term, Temporary Storage of Class B and C Low-Level Radioactive Waste

The Fermi 3 RWB was reconfigured to accommodate a minimum 10 years of volume from packaged Class B and C waste, while maintaining space for at least 3 months of packaged Class A waste. This reconfiguration results in changes in equipment location and layout affecting various DCD figures and tables. The replacement tables and figures are Tables 12.3-4R and 12.3-8R; Figures 12.3-19R through 12.3-22R, 12.3-39R through 12.2-42R, and 12.3-61R through 12.3-64R. The applicant performed a qualitative evaluation of each wall in the reconfigured RWB against the same wall and functions described in the DCD. This evaluation confirmed that the radiation zones in the departure will be maintained the same as those in the DCD.

COL Items

- STD COL 12.3-2-A — Operational Considerations

This COL item addresses operational considerations for airborne radiation monitoring such as the procedures for the operation and calibration of the monitors, as well as the placement of the portable monitors. The applicant references Section 12.5 of the FSAR, which in turn references NEI 07–03A.

- STD COL 12.3-4-A — Compliance with 10 CFR 20.1406

This COL item addresses the operational and post-construction objectives of RG 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning." The applicant states that implemented programs and procedures are consistent with NEI 08–08A, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination," (ADAMS Accession No. ML093220530) and meet the objectives of RG 4.21 and the requirements of 10 CFR 20.1406, "Minimization of contamination."

Supplemental Information

- EF3 SUP 12.3-1 — Radwaste Building

In FSAR Revision 3 Subsection 12.3.1.4.5, "Radwaste Building," the applicant adds the following design features to minimize occupational exposure:

- Provision for control of fluids exiting high activity rooms, including provision to isolate floor drains, and remote operation of control valves from the radwaste control room.

- Piping from high activity rooms (process and drain piping) are arranged to minimize exposure to normally occupied areas, and are designed to maintain radiation levels in the RWB process system area, as shown in Figure 12.3-19R through Figure 12.3-22R.

12.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the radiation protection design features, and the associated acceptance criteria, are in Section 12.3-12.4 of NUREG-0800.

The staff followed the guidance in RG 1.206 to evaluate Fermi 3 FSAR Section 12.3 for compliance with NRC regulations.

In accordance with Section VIII, "Processes for Changes and Departures," of "Appendix E to Part 52 – Design Certification Rule for the Economic Simplified Boiling-Water Reactor," the applicant identifies one Tier 2 departure. Tier 2 departures not requiring prior NRC approval are subject to the requirements of 10 CFR Part 52, Appendix E, Section VIII.B.5, which are similar to the requirements of 10 CFR 50.59.

In particular, the regulatory basis for the acceptance of the COL items and the supplemental information is in the applicable requirements of 10 CFR Part 20; Part 50; and Part 70; and in the following guidelines:

- Item III.D.3.3 of NUREG–0737, "Clarification of TMI Action Plan Requirements."
- RG 1.97, Revision 4, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants."
- RG 4.21, RG 8.2, and RG 8.8.

12.3.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 12.3 of the certified ESBWR DCD. The staff reviewed Section 12.3 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to the "Radiation Protection Design Features."

The staff also reviewed the applicant's proposed departure, the proposed resolution to the COL items, and the supplemental information included under Section 12.3 of the Fermi 3 COL FSAR. In the review, the staff used the applicable sections of the SRP and RG 1.206 as guidance.

Section 1.2.3 of this SER discusses the NRC's strategy for performing one technical review for each standard issue outside the scope of the DC and to use this review to evaluate the subsequent COL applications. To ensure that the staff's findings on the standard content that were documented in the SER with open items issued for the North Anna Unit 3 application are equally applicable to the Fermi 3 COL application, the staff undertook the following reviews:

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

- The staff compared the North Anna Unit 3 COL FSAR Revision 1, to the Fermi 3 COL FSAR, Revision 3. In this comparison, the staff considered changes to the Fermi 3 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the North Anna SER with open items.

- The staff confirmed that the applicant has endorsed all responses to the RAIs in the corresponding standard content (the North Anna SER) evaluation.

- The staff verified that the site-specific differences are not relevant to this section.

The staff completed the review and finds the evaluation of the North Anna standard content to be directly applicable to the Fermi 3 COL application. This SER identifies the standard content material with italicized, double-indented formatting.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

Tier 2 Departure Not Requiring Prior NRC Approval

- EF3 DEP 11.4-1 — Long-Term, Temporary Storage of Class B and C Low-Level Radioactive Waste

FSAR Section 12.3, Revision 2, provides revised DCD tables and figures as a result of Departure EF3 DEP 11.4-1. In Part 7 of the COL application, the applicant states that consistent with the guidance of NUREG–0800 Section 11.4, the Fermi 3 RWB waste storage space is configured to accommodate at least 10 years of Class B and C waste generated during plant operation. In addition, a shielding analysis was performed for this design change showing that the resultant dose rates in surrounding areas—within the building and externally—are maintained below the allowable limits in accordance with the radiological area classification in DCD Tier 2, Subsection 12.3.1.3. Long-term temporary storage of Class B and C waste in high integrity containers, with design lifetimes of 300 years, will not adversely affect the integrity of the waste containers. Furthermore, periodic inspections will be performed to confirm container integrity during storage. However, there is no discussion of this departure in FSAR Section 12.3, Revision 2.

The staff reviewed the information in Part 7 of the COL application. A comparison of the revised FSAR tables and figures with those in Section 12.3 of DCD Tier 2 Revision 7 revealed numerous changes in room layout and dimensions, with some FSAR rooms/walls showing elevations above the grade level, where as in Section 12.3 of the DCD they are below grade. In addition, the layout changes resulted in changes in access and egress routes within this building. In order for the staff to better evaluate what impact the changes described in this departure would have on the RWB, as described in the DCD, the staff issued RAI 12.03-12.04-7 requesting the following from the applicant:

1. Provide a discussion of this departure in FSAR Section 12.3 and include a discussion in the FSAR of the table (Table 12.3-8) and figures (Figures 12.3) added to Chapter 12 of the FSAR.

2. Verify that the source terms used for the components in the radwaste building are the same as those provided in Section 12.3 of the DCD Revision 7.

3. Provide analyses and descriptions of the effects of the geometry and layout changes (made for the Fermi radwaste building) on the various radwaste building dose rates calculated in the DCD.

4. Describe the basis for any differences between the equipment dimensions for the various pieces of equipment located in the various rooms in the radwaste building at Fermi and the comparable values described in the DCD (as described in Table 12.2-22 of the DCD).

5. Describe any differences in shield wall thickness between those specified in FSAR Table 12.3-8R and in the comparable thickness shown in Table 12.3-8 of the ESBWR DCD and describe the basis for any differences.

The applicant's response to RAI 12.03-12.04-7 dated October 19, 2010 (ADAMS Accession No. ML102940218), provided the requested information and the revised affected FSAR pages. In the responses to Items 1 and 2, the applicant provided additional information in Section 12.3 of the COL FSAR describing the effects from Departure EF3 DEP 11.4-1. This departure reconfigured the RWB to accommodate increased storage space capacity for Class B and C solid waste. The applicant identified the various ESBWR DCD tables and figures that were affected by this departure. The applicant added that the equipment size, content, and source terms remained unchanged. The thicknesses of RWB walls were revised to maintain the same radiation zones as those identified in the DCD. The radiation levels and the required shielding will therefore remain the same regardless of equipment locations, which were revised. The applicant provides FSAR Table 12.3-8R and Figures 12.3-19R through 12.3-22R show the revised wall thicknesses and the reconfigured equipment locations in the RWB. The staff reviewed the applicant's information, compared the revised figures and tables against those in the DCD, and found the changes acceptable.

In response to Items 3 through 5, the applicant provided a qualitative evaluation of the revised wall thickness changes against those identified in the DCD. The applicant restated that equipment dimensions, source geometry, and source characteristics and quantities except for room number changes remain unchanged and are similar to those in ESBWR DCD, Tier 2, Table 12.2-22. The applicant provided FSAR Table 12.2-22R identifying the room number changes for select equipment in the RWB. Based on this evaluation, the applicant concluded that the radiation zones in the departure are maintained the same as those in the DCD.

The staff reviewed the applicant's revised information and compared it against the information in the DCD. The staff's review confirmed that the revised equipment locations would not result in changes in radiation zones that could impact the calculated DCD dose rates. The staff finds that the revised configuration enhances the arrangement of equipment locations. In this arrangement, the rooms with lower radiation zones are usually located between the corridor and the rooms with equipment containing higher radiation sources. Equipment cubicles with high radiation sources that are adjacent to a corridor have thicker concrete walls than the comparable cubicle walls in the DCD, in order to reduce the doses in the adjacent corridors. Except for Room 6251, the Departure EF3 DEP 11.4-1 would not impact the dose rates calculated in the DCD; and the dose rates in each corridor would be maintained below the allowable limits.

During the review of the equipment relocation depicted in RWB Figures 12.3-19R and 12.3-20R, the staff noted the relocation of equipment for the high activity phase separator from the ground floor, at elevation -9350 millimeter (mm) (-30.68 ft) (Room 6151 in Figure 12.3-19 of

the ESBWR DCD) to the second floor, at elevation -2350 mm (-7.71 ft) (Room 6251 in Figure 12.2-20R of the Fermi FSAR). DCD Subsection 11.2.2.3.2 states, "Tank cubicles are lined with steel to preclude accidental releases to the environment." However, the applicant did not provide any information on design provisions for controlling radioactive contamination. Furthermore, a review of the wall thicknesses listed in Table 1 of the applicant's response to RAI 12.03-12.04-7 identified the wall thickness of 100 cm (3.28 ft) in the DCD in those areas where a wall separates high activity tanks (with radiation zone levels of H or I) from a corridor. This approach is used in the reconfigured RWB except for the walls of the cubicle housing the high activity phase separator (Room 6251). In the DCD RWB configuration, this room is identified as a radiation Zone H with a cubicle wall thickness of 100 cm (3.28 ft) adjacent to the corridor (the southern wall of Room 6151). The drawing of the reconfigured layout in the FSAR shows that the walls adjacent to the corridor (the western wall of Room 6251) and to the control room (the eastern wall of Room 6251) on the second floor are only 90 cm (2.95 ft) thick. Therefore, the staff issued RAI 12.03-12.04-9 requesting the applicant to provide the following:

1) Explain the provisions included in this design to prevent the spread of contamination in the case of a tank leak or tank failure in Room 6251. RG 8.8 states that the exposure to station personnel to radiation from pipes carrying radioactive material can be reduced by means of shielded chases.

2) Explain any shielding provisions incorporated for the floor drain and the drain pipe for Room 6251 that would serve to minimize the potential of increased dose rates in the adjacent areas traversed by the room drain line in the event of a tank leak or failure in Room 6251.

3) Explain why the west- and east-facing walls for this radiation Zone H cubicle do not have a thickness of 100 cm to ensure that the radiation zoning of the corridor and the control room (both Zone B areas), respectively, are not exceeded due to the radiation sources in Room 6251.

In FSAR Revision 3, Subsection 12.3.1.4.5, the applicant added Supplemental Item EF3 SUP 12.3-1 to address design provision features for the RWB (see the "Supplemental Information" section below). In addition, the applicant revised FSAR Table 12.3-8R to change the wall thickness in Room 6251 to be consistent with the design provisions in the DCD. Furthermore, the applicant's response to RAI 12.03-12.04-9 dated March 29, 2011 (ADAMS Accession No. ML110900094), provided additional explanations regarding the changes in FSAR Revision 3, Subsection 12.3.1.4.5. The applicant also emphasized that the revisions to the wall thickness of the east- and west-facing walls for Room 6251, from 90 cm (2.95 ft) to 100 cm (3.28 ft), are consistent with the wall thicknesses of the comparable cubicle walls in the DCD. These wall thickness revisions resolve the staff's concerns in Item 3 of RAI 12.03-12.04-9. Resolutions of RAI Items 1 and 2 are discussed in the "Supplemental Information" section below.

During the review of the revised RWB layout drawings in FSAR Figures 12.3-21R and 12.3-41R, the staff noted that the radiation zone and area radiation monitor assignments in Room 6381 (elevation 4650 mm [15.26ft]) were not consistent with the radiation zone and area radiation monitor assignments for the comparable location shown in DCD Figures 12.3-21 and 12.3-41. The applicant explained the reason for this change to the staff by stating that the assigned radiation zone and the area monitor in Room 6381 in the FSAR are for the two skid-mounted liquid processing subsystems, which have their own shielding blocks. Therefore, the radiation zone level will be low when they are operating and even lower when the systems are

shut down. In the supplemental response to RAI 11.04-2 dated August 24, 2011 (ADAMS Accession No. ML11238A049), the applicant provided a revised FSAR Figure 12.3-21R with the following note:

> The skid-mounted processing subsystems, located in Room 6381, are individually shielded to allow [personnel] access in the room; which is classified as Radiation Zone C.

The addition of this note to the FSAR figure resolves the staff's concerns regarding inconsistencies in radiation zones between the DCD and COL FSAR in this portion of the RWB. The staff, therefore, finds this supplemental response to RAI 11.04-2 acceptable.

The applicant's evaluation determined that this departure does not require prior NRC approval in accordance with 10 CFR Part 52, Appendix E, Section VIII.B.5. Within the review scope of this section, the staff finds it reasonable that the departure does not require prior NRC approval. The applicant's process for evaluating departures and other changes to the DCD is subject to NRC inspection.

COL Items

The following portion of this technical evaluation section is reproduced from Section 12.3.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL 12.3-2-A Operational Considerations*

The applicant provided additional information in STD COL 12.3-2-A to address the resolution of DCD COL Item 12.3-2-A, which states:

> *"Airborne radiation monitoring operational considerations, such as the procedures for operations and calibration of the monitors, as well as the placement of the portable monitors, are the COL applicant's responsibility."*

The staff reviewed STD COL 12.3-2-A in regards to airborne radiation monitoring operational considerations included in Section 12.3.4 of the North Anna COL FSAR. The COL applicant stated that the airborne radioactivity monitors are classified as non-safety related. Although airborne radioactivity monitors are classified as non-safety related, they are necessary to show compliance with 10 CFR 20.1501.

The COL applicant stated that operation considerations and portable monitor placement are discussed in COL Section 12.5. COL Section 12.5 references NEI 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description," which the staff is currently reviewing. NEI 07–03 describes several monitoring instruments that will be maintained and used at the facility, including:

- *High and low volume air samplers used to take grab samples to assess airborne radioactivity concentrations to determine respiratory protection measures;*

- *Continuous air monitors to observe trends in airborne radioactivity concentrations and to alert personnel of sudden changes in airborne radioactivity concentrations;*

- *Portable air sampling and analysis system to determine airborne radioiodine concentrations during and following an accident; and*

- *Portable sampling and on-site analysis capability to assess airborne radio-halogens and particulates released during and following an accident.*

Section 12.5.4.1 of NEI 07–03 describes the operational considerations of these monitors. The template states that airborne radioactivity levels are surveyed by using continuous air monitors (CAMs) and by taking grab samples using portable high and low volume air samplers. The CAM alarm set points are set at a fraction of the concentration values in 10 CFR Part 20, Appendix B, Table 1 (Column 3) for radionuclides expected to be encountered.

Section 12.5.4.1 of NEI 07–03 also describes calibration frequency and procedures for airborne monitors. The template states that continuous air monitors have daily operational checks to test function or response. All monitors used to perform surveys are calibrated before initial use, after maintenance or repairs that might affect the calibration, and at least annually. In addition, emergency and special-use monitors will have operational checks on a regular schedule as specified in written procedures.

In response to the staff's RAI 12.03/04-1 requesting the applicant to describe the criteria for the placement and sensitivities of portable airborne monitors, the applicant stated that the requested information is contained in NEI template 07-03. Section 12.5.3.2 of this template states that CAMs equipped with local alarm capability are used in occupied areas where needed to alert personnel to sudden changes in airborne radioactivity concentrations. This section also states that radiation monitoring instrumentation and equipment will provide the appropriate detection capabilities, ranges, sensitivities, and accuracies required for the types and levels of radiation anticipated in the plant and in the environs during routine operations, major outages, abnormal occurrences, and postulated accident conditions. Staff RAI 12.03/04-1 also requested the applicant to verify that North Anna 3 has a sufficient number of portable airborne radiation monitors to sample air at all normally occupied locations where airborne radioactivity may exist. The applicant stated that Milestone 1.c. of NEI template 07–03 ensures that an adequate number of instruments is available to provide for appropriate detection capabilities to conduct radiation surveys in accordance with 10 CRF 20.1501 and 20.1502, including the capability to sample air at all normally occupied locations where airborne radioactivity may exist. The staff finds that the applicant has adequately described the airborne radiation monitoring operational considerations to resolve both RAI 12.03/04-1 and DCD COL Item 12.3-2-A. Since the applicant references this template in responses to both RAI 12.03/04-1 and DCD COL Item 12.3-2-A, the staff cannot consider either RAI 12.03/04-1 or DCD COL Item 12.3-2-A resolved until the staff approves this template. The applicant has committed to update the FSAR to reference the final version of this template.

In Fermi 3 FSAR Revision 3, the applicant references the final version of NEI 07–03 (i.e., NEI 07–03A) in Section 12.5. As stated earlier, the staff reviewed and approved this template for addressing this COL item. Therefore, this response addressing COL Item STD COL 12.3-2-A (description of operational considerations for airborne radiation monitoring) is acceptable and Standard RAI 12.03/04-1 is closed.

In addition, the review identified the following area as requiring an evaluation, which is summarized below:

Standard conceptual design information (STD CDI) for Fermi FSAR Subsection 1.2.2.12.15, "Zinc Injection System," states that a zinc injection system (ZIS) will not be utilized at Fermi 3. One of the benefits from using a ZIS to inject depleted zinc oxide (DZO) into the feedwater is to suppress cobalt plate-out on reactor building piping. Minimizing the plate-out of radioactive cobalt on reactor building piping can lead to potentially lower dose rates in the vicinity of this piping and result in correspondingly lower doses to personnel in this part of the plant. Therefore, NRC staff issued RAI 12.03-12.04-2 requesting the applicant to justify the decision not to utilize a ZIS in light of the requirement in 10 CFR 20.1101, "Radiation Protection Programs." This requirement states that the licensee shall use, to the extent practical, procedures and engineering controls based on sound radiation protection principles to achieve occupational doses that are ALARA.

In the response to this RAI dated April 23, 2009 (ADAMS Accession No. ML091250352), the applicant provided the following rationale for not using zinc injections at Fermi 3. The applicant is using an alternate method to minimize the plate-out of radioactive cobalt on reactor components. The ESBWR standard plant restricts the cobalt content in reactor vessel stainless steel components and other selected stainless steel components that have large surface areas exposed to high flow rates toward the reactor vessel. This restriction minimizes and/or eliminates the use of components containing Stellite, which is a high cobalt alloy. Because this design reduces the potential for creating radioactive cobalt in the primary system, there is potentially less cobalt in the reactor coolant to plate-out on reactor building piping. The staff finds that the use of this method to minimize the plate-out of radioactive cobalt is an acceptable alternative to zinc injections. In addition, the facility design incorporates design features that permit the addition of the ZIS at a later date, if increases in personnel exposures should occur at the facility from the plate-out of radioactive cobalt and warrant the change. Therefore, no revision to the FSAR is required. The staff finds the response acceptable, because the applicant retains the option of utilizing the ZIS if needed. Therefore, this RAI 12.03-12.04-2 is closed.

- STD COL 12.3-4-A Compliance with 10 CFR 20.1406

In FSAR Subsection 12.3.1.5, Revision 2, the applicant provides supplemental information related to compliance with 10 CFR 20.1406 in regard to operational and programmatic considerations that the applicant will implement to prevent the spread of contamination and thereby facilitate decommissioning. The applicant lists several measures that prevent the spread of contamination and are consistent with the operational and post-construction objectives in RG 4.21, Regulatory Positions C.1 through C.4.

The applicant states that these objectives include:

- Periodic review of operational practices to ensure that operating procedures reflect the installation of new or modified equipment, personnel qualification and training are kept current, and personnel are following the operating procedures.
- Maintenance of records relating to facility design and construction, facility design changes, site conditions before and after construction, onsite waste disposal and contamination, and results of radiological surveys.
- Maintenance of a conceptual site model based on site characterization and facility design and construction.
- Evaluation of the final site configuration after construction to assist in preventing the migration of radionuclides offsite via unmonitored pathways.
- Implementation of an onsite contamination monitoring program along the potential pathways from the release sources to the receptor points.

The staff finds that these objectives meet those of RG 4.21 and are therefore acceptable and meet the requirements of 10 CFR 20.1406.

In Subsection 12.3.1.5.1 of the ESBWR DCD, Tier 2, Revision 7, piping containing segments that will have to run underground includes (1) the CST and CST retention area drain; (2) the radwaste effluent discharge pipeline; (3) the cooling tower blowdown line; and (4) the hot machine shop drain. This section of the DCD also states that these lines will be kept as short and direct as possible, and they will be designed to preclude an inadvertent or unidentified leakage into the environment. In accordance with the guidance in RG 4.21, DCD Subsection 12.3.1.5.1 states that the underground pipes for these systems and components are either enclosed within a guard pipe and are monitored for leakage, or they are accessible for visual inspections via a trench or tunnel.

Fermi 3 FSAR Subsection 12.3.1.5, Revision 2, provided supplemental information addressing STD COL 12.3-4-A. However, this response failed to include site-specific provisions that minimize the potential for unmonitored and uncontrolled releases into the environment from the underground piping. Therefore, NRC staff issued RAI 12.03-12.04-6 requesting the applicant to modify FSAR Subsection 12.3.1.5 to include:

a. A list of the system and components at Fermi with segments of piping that will be run underground.

b. A description of the features associated with the underground piping for each system and the components that minimize contamination, in accordance with the guidance in RG 4.21 and the requirements of 10 CFR 20.1406.

c. A description of the monitoring program associated with the piping for each of these system and components that will ensure that the potential for unmonitored, uncontrolled releases of radioactivity to the environment from these pipes will be minimized;

d. A description of the portion of the discharge line that runs from the cooling tower blowdown to the point of release into the environment beyond the owner-controlled area or the exclusion area boundary. Also include a description of the monitoring program associated with this portion of the discharge piping ensuring that the potential for

unmonitored, uncontrolled releases of radioactivity into the environment will be minimized.

e. Incorporate by reference NEI Template 08–08A, which addresses the guidance in RG 4.21 and the requirements of 10 CFR 20.1406.

In the response to RAI 12.03-12.04-6 dated October 19, 2010 (ADAMS Accession No. ML102940218), the applicant provided the requested information and the revised affected FSAR pages. In response to Part a, the applicant cited ESBWR DCD, Revision 7, Subsection 12.3.1.5, which identifies systems with pipe segments buried underground that could potentially contain radioactive fluids. In addition, the applicant identified the site-specific systems with buried pipe segments that have no potential for containing radioactive fluids. The staff finds this information acceptable.

In response to Parts b and c of this RAI, the applicant stated that the Fermi 3 FSAR incorporates by reference Subsection 12.3.1.5 of the ESBWR DCD. This DCD subsection lists features that are provided to minimize contamination, in accordance with the guidance in RG 4.21 and the requirements of 10 CFR 20.1406. The applicant added that there are no other buried pipe segments with the potential for containing radioactive fluid. Therefore, the provisions stated in DCD Subsection 12.3.1.5 will be followed. The applicant also added the following statement to COL FSAR Subsection 12.3.1.5:

> There are no other underground piping segments at Fermi 3 that require features to minimize contamination or monitoring to ensure that the potential for unmonitored, uncontrolled releases of radioactivity to the environment is minimized.

The staff finds that the applicant's response adequately addresses Parts b and c of RAI 12.03-12.04-6.

In response to Part d of this RAI, the applicant provided a brief description of the blowdown piping and its point of release into Lake Erie. The applicant stated that the blowdown line is a 122-cm (4-ft) diameter pipe that is buried until the point where it enters Lake Erie. The blowdown line will continue for approximately 396 m (1300 ft) into Lake Erie, where it will discharge underwater into the lake. The underground portion of this blowdown line will be designed with the features described in ESBWR DCD, Revision 7, Subsection 12.3.1.5.1, which preclude an inadvertent or unidentified leakage into the environment.

In the supplemental responses to RAI 12.03-12.04-6 dated August 1, 2011 (ADAMS Accession No. ML1121A1021); and August 24, 2011 (ADAMS Accession No. ML11238A049), the applicant modified FSAR Subsection 11.2.3.2 by adding Supplemental Information EF3 SUP 11.2-2. This supplement states that the LWMS exterior discharge piping from the Fermi 3 RWB is a buried stainless steel pipe with no valves, vacuum breakers, or other inline components; it is enclosed within a guard pipe that is monitored for leakage to comply with 10 CFR 20.1406. The LWMS discharge line connects to the blowdown line within the exclusion area boundary for dilution below the release limits of 10 CFR Part 20, Appendix B, Table 2, Column 2. The blowdown line is a buried high-density polyethylene pipe with no valves, vacuum breaker, or other inline components in the blowdown downstream of the LWMS connections as required by DCD Subsection 12.3.1.5.1. Monitoring the blowdown line downstream of the LWMS connection will be consistent with NEI 08–08A, as described in Fermi 3 COL FSAR Subsection 12.3.1.5.2.

Based on the above information, the staff finds the applicant's response to Part d acceptable because the design of the LWMS discharge and blowdown piping and the associated monitoring program will ensure that the potential for unmonitored and uncontrolled releases of radioactivity into the environment will be minimized.

In response to Part e, the applicant's supplement to FSAR Subsection 12.3.1.5.2 states:

> Program and procedures are implemented consistent with the NEI 08–08A, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination," to meet the post-construction and operational objectives of Regulatory Guide 4.21 and the requirements of 10 CFR 20.1406.

In addition, the applicant stated that the underground portion of the blowdown line will be monitored by an on-site ground water monitoring program that will be consistent with NEI 08-08A. The applicant added that Fermi 3 COL FSAR Subsection 2.4.12.4 describes the onsite ground water monitoring program. The applicant revised this subsection to include a reference to NEI 08–08A thus ensuring that the considerations in this NEI report are included in the ground water monitoring program. The applicant will establish this groundwater monitoring program to ensure the timely detection of any inadvertent radiological releases into the ground water, in accordance with the guidance of RG 4.21. The applicant added Commitment (COM 13.4-034) to Table 13.4-201 as Operational Program Item #22 to develop an operational program for the lifecycle minimization of contamination, in compliance with 10 CFR 20.1406 before fuel loading. This proposed Commitment (COM 13.4-034) will be a license condition (License Condition 12.3-1). License Condition 12.3-1 states:

> Prior to initial fuel load, the licensee shall implement an operational program for lifecycle minimization of contamination.

The staff's review of the applicant's response and the proposed changes to the affected pages in COL FSAR Subsections 12.3.1.5.2 and 2.4.12.4 finds the applicant's information adequately addresses this concern. In addition, Operational Program Item #22 in Table 13.4-201 is composed of a number of elements and considerations that are described in NEI 08–08A. Because, the applicant incorporates by reference NEI 08–08A into FSAR Subsection 12.3.1.5.2 and other affected sections, the staff finds this program milestone acceptable. The staff verified that FSAR Revision 3 includes the applicant's proposed changes. Therefore, this RAI 12.03-12.04-6 is closed.

For operational program readiness in Section 3.6 of Part 10 of the COL application, the applicant proposed to add a general implementation plan for operational programs which are listed in Table 13.4-201. The applicant provided this general implementation plan as a new license condition in response to RAI 19.03-38 dated August 16, 2011 (ADAMS Accession No. ML11229A767). This implementation plan (License Condition 12.3-2) states:

> The licensee shall submit to the appropriate director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first.

The staff verified that the proposed license conditions for the lifecycle minimization of contamination (License Condition 12.3-1) and for the operational programs implementation plan (License Condition 13.3-2) are in Revision 4 of the COL application. On the basis of the information described above, the staff finds the applicant adequately addresses COL Item STD COL12.3-4-A (compliance with 10 CFR 20.1406).

Supplemental Information

- EF3 SUP 12.3-1 Radwaste Building

In FSAR Subsection 12.3.1.4.5, "Radwaste Building," the applicant adds the following design features to minimize occupational exposures:

- Provision for control of fluids exiting high activity rooms, including provision to isolate floor drains, and remote operation of control valves from the radwaste control room.

- Piping from high activity rooms (process and drain piping) are arranged to minimize exposure to normally occupied areas, and are designed to maintain radiation levels in the RWB process system area, as shown in Figure 12.3-19R through Figure 12.3-22R.

These design provisions are in response to the staff's concerns discussed in RAIs 12.03-12.04-7 and 12.03-12.04-9. In the response to Item 1 of RAI 12.03-12.04-9 (ADAMS Accession No. ML110900094), the applicant added that the first provision provides an isolation capability (both local and remote) to prevent the spread of contamination. In response to Item 2 of RAI 12.03-12.04-9, the applicant noted that the second provision minimizes occupational exposures from radioactive fluid in the piping. With regard to conformance with RG 8.8, the applicant stated that FSAR Table 1.9-202 shows that Fermi 3 conforms to RG 8.8. This RG encompasses conformance with guidelines related to facility and equipment design, including pipe routing and shielding to minimize occupational exposures. Therefore, the staff finds the applicant's response in Supplemental Information EF3 SUP 12.3-1 acceptable. As described above, the staff finds that the applicant has adequately responded to RAIs 12.03-12.04-7 and 12.03-12.04-9. The applicant amended the Fermi 3 COL FSAR to incorporate these responses. The applicant also amended Section 12.3 of the Fermi 3 COL FSAR to provide a discussion of the changes associated with Departure EF3 DEP 11.4-1. In addition to discussing the source terms and shield wall thicknesses in the RWB, the applicant added a supplement to the Fermi 3 COL FSAR to address provisions for controlling radioactive contamination from leaks and shielding pipe chases in the RWB. Therefore, RAI 12.03-12.04-7 and RAI 12.03-12.04-9 are resolved and closed.

12.3.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the staff identifies the following two license conditions:

- License Condition (12.3-1) - Prior to initial fuel load, the licensee shall implement an operational program for lifecycle minimization of contamination.

- License Condition (12.3-2) – No later than 12 months after issuance of the COL, the licensee shall submit to the Director of the Office of New Reactors (NRO) a schedule that supports planning for and conduct of NRC inspections of the operational program(for lifecycle minimization of contamination). The schedule shall be updated

every 6 months until 12 months before scheduled fuel loading, and every month thereafter until this operational program has been fully implemented.

12.3.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the relevant information related to radiation protection design features, and no outstanding information is expected to be addressed in the Fermi 3 COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the radiation protection design features that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in Section 12.3-12.4 of NUREG–0800, and other NRC RGs. The staff's review finds that the applicant has adequately addressed the COL items relating to (1) operational considerations for in-plant airborne radiation monitoring operational considerations (STD COL 12.3-2-A); and (2) the minimization of contamination to facilitate decommissioning by committing to implement the required programs and procedures consistent with the NEI 08–08A (STD COL 12.3-4-A). The RWB reconfiguration departure is reasonable and is in accordance with 10 CFR 52.63(b)(2). Therefore, the staff finds that the applicant adequately addresses the radiation protection design features.

12.4 Dose Assessment

12.4.1 Introduction

This FSAR section addresses the issues related to estimating the annual personnel doses associated with the plant's operation, normal maintenance, radwaste handling, refueling, ISI, and special maintenance (e.g., maintenance that goes beyond routine scheduled maintenance; the modification of equipment to upgrade the plant; and repairs to failed components).

12.4.2 Summary of Application

Section 12.4 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 12.4 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 12.4, the applicant provides the following:

Supplemental Information:

- EF3 SUP 12.4-1 Annual Doses to Construction Workers

This site-specific supplemental information addresses the potential dose to construction workers from operations and emissions associated with the current operating nuclear power plant at the nearby site. Revision 3 of the Fermi 3 COL FSAR provides supplemental information on doses to construction workers from Section 4.5 of the Fermi 3 ER, in Part 3 of the COL application.

12.4.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the dose assessment, and the associated acceptance criteria, are in Section 12.3-12.4 of NUREG–0800.

The staff followed the guidance in RG 1.206 to evaluate Fermi 3 FSAR Section 12.4 for compliance with NRC regulations.

In particular, the regulatory basis for the acceptance of the supplemental information is in the applicable requirements of 10 CFR Part 20 and the guidance in RG 1.206 and in Section 4.5, "Radiation Exposure to Construction Workers," of NUREG–1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants."

12.4.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 12.4 of the certified ESBWR DCD. The staff reviewed Section 12.4 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to "Dose Assessment."

In addition, the staff reviewed the supplemental information under Section 12.4 of the Fermi 3 COL FSAR. The staff used the applicable sections of the SRP and RG 1.206 as guidance.

Section 1.2.3 of this SER discusses the NRC's strategy for performing one technical review for each standard issue outside the scope of the DC and to use this review to evaluate the subsequent COL applications. To ensure that the staff's findings on the standard content that were documented in the SER with open items for the North Anna Unit 3 application are equally applicable to the Fermi 3 COL application, the staff undertook the following reviews:

- The staff compared the North Anna Unit 3 COL FSAR, Revision 1, to the Fermi 3 COL FSAR, Revision 3. In this comparison, the staff considered changes to the Fermi 3 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the North Anna SER with open items.

- The staff confirmed that the applicant has endorsed all responses to the RAIs in the corresponding standard content (the North Anna SER) evaluation.

- The staff verified that the site-specific differences are not relevant to this section.

The staff completed the review and finds the evaluation of the North Anna standard content to be directly applicable to the Fermi 3 COL application. This SER identifies the standard content material with italicized, double-indented formatting.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

Supplemental Information

- EF3 SUP 12.4-1 Annual Doses to Construction Workers

This supplemental information discusses the sources of radiation exposure to construction workers and provides the basis for the applicant's annual and collective dose estimates to construction workers. However, in Revision 1 to the Fermi 3 COL FSAR, the applicant did not provide any information on annual doses to construction workers and stated that this information is addressed in the Fermi 3 ER. During the staff's review of the Fermi 3 COL FSAR, the staff identified a number of issues requiring clarification. The staff issued several RAIs requesting the applicant to amend Section 12.4 of the FSAR by adding information that would address the staff's concerns regarding doses to Fermi 3 construction workers. The following paragraphs discuss the staff's evaluation of the applicant's responses to these RAIs.

The sources of radiation exposures to site preparation and construction workers include direct radiation and gaseous radioactive effluents from Fermi 2 operations. The applicant states that the dose estimate to construction workers from liquid effluents (which are discharged into Lake Erie) are negligible, and from 1999 through 2008 there were no liquid radioactive effluent releases from Fermi 2 (1999 through 2008 is the time period used to estimate Fermi 2 dose contributions to Fermi 3 construction workers). Furthermore, the applicant states that exposures to construction workers from Fermi 2 releases of radioactive liquid effluents (via the radwaste discharge into Lake Erie) are expected to be negligible. This is because Lake Erie dilutes these effluents through natural mixing characteristics in the vicinity of the discharge point to the lake. In addition, construction activities for Fermi 3 would be approximately 800 m (0.5 mi) from the Fermi 2 liquid effluents release point.

A. Direct Radiation Dose

The applicant identifies three sources of direct radiation doses to construction workers as N-16, the CST and the onsite low-level storage facility, and the ISFSI. N-16 is present in the operating Fermi 2 main steam lines, turbines, and moisture separators. Other sources at Fermi 2 with the potential for a direct radiation dose contribution to construction workers are the CST and the onsite low-level waste storage facility. However, these sources are considered negligible because of the minimal activity contained in the storage tanks and the concrete shielding used in the design of the onsite storage facility. Although the applicant has recently constructed an ISFSI at the Fermi site, as of June 2012, normal operations at the ISFSI had not yet started ("Environmental Impact Statement for the Combined License (COL) for Enrico Fermi Unit 3," NUREG–2105, Vol. 1).

The applicant states that thermoluminescent dosimeters (TLDs) are used to measure the radiation exposure at various locations around the Fermi 2 site. These measurements are then used to estimate the direct radiation dose to construction workers. There are three TLD stations (TLD T-47, T-48, and T-54) that are relevant to these estimated doses because of the proximity of the TLDs to the Fermi 3 construction site. The applicant considers TLD StationT-48 to be at the most representative location of the three TLD stations. The applicant uses the highest annual dose measurement recorded at this location for the period from 1999 through 2008, as the estimated direct radiation dose to a construction worker from the Fermi 2 operation.

In order for the staff to evaluate the basis for the applicant's construction worker dose estimates, the staff issued RAI 12.03-12.04-3 requesting the applicant to amend Section 12.4 of the Fermi 3 COL FSAR to provide (1) the basis for the thyroid and whole body dose calculations; (2) the estimated maximum annual number of construction workers in the applicant's construction worker dose calculations; (3) the effects of future Fermi 1 decommissioning activities on exposure doses to Fermi 3 construction workers; and (4) plans for radiological monitoring of the Fermi 3 construction site to verify construction worker dose calculations.

In the response to RAI 12.03-12.04-3 dated August 25, 2009 (ADAMS Accession No. ML092580311), the applicant provided the requested information. The applicant included the selected TLD stations and the associated dose rates at these stations, an estimate of the peak annual number of construction workers, the dose from Fermi 1 decommissioning activities, and the plans for the radiological monitoring of the Fermi 3 construction site.

In discussing the basis for the construction worker dose calculations (Item 1 of RAI 12.03-12.04-3), the applicant stated that based on a review of the site layout, there are three TLD stations (i.e., T-47, T-48, and T-54) located closest to the Fermi 3 construction site that could be used to determine direct dose measurements for construction workers. TLD Station T-54, which is located at the visitor center, is farthest from Fermi 2; and TLD Station T-48 is the nearest TLD station to Fermi 2. TLD Stations T-47 and T-48 are closest to the Fermi 3 site construction activities. TLD Station T-47 has the highest direct dose measurement, is just outside the Fermi 2 protected area, and is further from the future locations of Fermi 3 structures than TLD Station T-48 is. Therefore, the applicant considered TLD Station T-48 to be at the most representative location of the three TLDs and proposed to use the dose rate measurements from TLD Station T-48 to estimate direct exposures to Fermi 3 construction workers.

With respect to Item 2 of RAI 12.03-12.04-3, the applicant estimated that during peak periods of construction, there will be 2,900 workers onsite. This is the number the applicant uses to determine the maximum collective annual construction worker dose.

Regarding RAI Item 3 on the effects from future Fermi 1 decommissioning activities on Fermi 3 construction workers, the applicant stated that the exposures measured at all three TLD stations also include the dose contribution from Fermi 1. The ongoing decommissioning of Fermi 1 will continue to reduce the Fermi 1 dose contributions to these TLDs. The applicant added that the acceptable residual levels of radioactive material that could be present after decommissioning is subject to the limits established in 10 CFR 20.1402, "Radiological criteria for unrestricted use," with a maximum annual total effective dose equivalent of 0.25 mSv (25 mrem) to an "average member of the critical group." For Fermi 1, an "average member of the critical group" would be best represented by the resident farmer scenario, where the dose received by this individual would include internal dose contributions from the ingestion of plant foods grown on the Fermi 1 site; consumption of meat and milk produced on the Fermi 1 site; drinking water from wells on the Fermi 1 site; and eating fish from a pond that is contaminated from the residual radioactivity on the Fermi 1 site. A Fermi 3 construction worker would not be exposed to these dose pathways and would therefore receive less than the estimated 0.25 mSv (25 mrem) per year. Nevertheless, the applicant considers this dose to be a conservative estimate of the dose to a construction worker during Fermi 3 construction activities on the Fermi 1 site.

With respect to RAI Item 4 on plans for radiological monitoring of the Fermi 3 construction site, the applicant stated that Detroit Edison will develop the necessary program required to monitor the dose to Fermi 3 construction workers and to verify construction worker dose calculations.

The staff evaluated the applicant's response to RAI 12.03-12.04-3. The staff finds that the estimated maximum work force size of 2,900 workers is comparable in number to the work force size estimated by other applicants for the construction of a new unit. For this reason, the staff finds this response acceptable. The staff agrees with the applicant's response that Fermi 3 construction workers will likely receive an annual direct dose from Fermi 1 that is less than 0.25 mSv/yr (25 mrem/yr). The staff finds this annual dose contribution conservative and therefore acceptable. The staff also finds the applicant's plans for the radiological monitoring of Fermi 3 construction workers acceptable.

As discussed above, the applicant's response to Item 1 of RAI 12.03-12.04-3 considers TLD Station T-48 to be the most representative TLD location for estimating the Fermi 2 direct radiation dose to construction workers. Although TLD Station T-48 is located closest to the Fermi 3 power block, TLD Station T-47 is located closer to Fermi 2 and therefore has a higher average dose reading compared with TLD Station T-48. It is the staff's position that basing the construction worker dose estimates solely on the dose rates measured at TLD Station T-48 would not be conservative, because the process ignores the dose rates at locations near TLD Station T-47. Therefore, in RAI 12.03-12.04-5, the staff requested the applicant to justify why the applicant should not base the construction worker dose estimates on the average of the readings from the TLDs at both TLD Stations T-47 and T-48 for the year with the highest TLD dose. Although the applicant provided acceptable responses to most of the staff's requests in RAI 12.03-12.04-3, the applicant only included a summary of this information in the Fermi 3 COL FSAR. Therefore, RAI 12.03-12.04-5 also requested the applicant to supplement Section 12.4 of the Fermi 3 COL FSAR by providing the bases, models, assumptions, and input data used to calculate doses to construction workers. In the response to RAI 12.03-12.04-5 dated May 21, 2010 (ADAMS Accession No. ML101450195), the applicant modified the basis for calculating the direct dose component to a construction worker by using the average maximum TLD measurements from TLD Stations T-47 and T-48. This modification increases the annual (2,080 worker hours) Fermi 2 direct dose component to construction workers from 0.32 mSv (32 mrem) to 0.563 mSv (56.3 mrem) (excluding background radiation). The staff finds that this change results in a more realistic estimate of doses to construction workers. This analysis is therefore acceptable.

Regarding the direct dose contribution to the construction worker from the ISFSI, the applicant states that the dose calculation uses a distance of about 250 m (820 ft) from the nearest construction area and assumes a uniform loading of all casks containing 15-year cooled spent fuel from Fermi 2. The annual estimated (2080 worker hours) direct dose to a construction worker from the Fermi 2 ISFSI is about 0.138 mSv (13.8 mrem). In order to evaluate the acceptability of the applicant's response, the staff compared the applicant's dose analysis with a similar acceptable ISFSI dose analysis performed by Grand Gulf for stored BWR spent fuel with similar characteristics (Grand Gulf RAI response dated October 9, 2008 [ADAMS Accession No. ML082880101]). On the basis of this comparison, the staff finds the applicant's dose estimate reasonable; and the applicant's ISFSI direct dose estimate is therefore acceptable.

The applicant states that the sum of the direct dose contributions from the operation of Fermi 2, the ISFSI, and the decommissioned Fermi 1 site is approximately 0.966 mSv (96.6 mrem) per year. Part of the applicant's response to RAI 12.03-12.04-5 describes some of the reasons why this construction worker dose estimate is conservative. As stated earlier, the 0.25 mSv (25 mrem) dose estimate from the decommissioned Fermi 1 site is based on the maximum annual dose to an "average member of the critical group" (as defined in 10 CFR 20.1402). Because the Fermi 3 construction worker would not be exposed to the dose pathways of the "average member of the critical group," these construction workers would be expected to

receive less than this estimated dose from the decommissioned Fermi 1 site. The 0.138mSv (13.8 mrem) dose estimate from the Fermi 2 ISFSI assumes that all casks are located at a single point without taking credit for cask-to-cask shielding. Therefore, the applicant states that actual dose rates from the ISFSI could be lower than estimated. Fermi 2 currently uses hydrogen water chemistry (HWC) to control the production of corrosive products to mitigate stress corrosion cracking. The use of HWC increases N-16 production and N-16 in the main steam lines, turbines, and moisture separators is one of the primary contributors to the direct dose measured at the TLD stations around Fermi 2. The applicant plans on implementing a noble metal chemistry program at Fermi 2 to reduce direct dose. The use of noble metal chemistry has proven to be instrumental in significantly reducing plant radiation levels. On the basis of TLD measurements taken before the HWC program was fully implemented at Fermi 2, the applicant estimates that the Fermi 2 direct dose contribution to Fermi 3 construction workers could be significantly reduced. Based on the reasons described in the applicant's response to RAI 12.03-12.04-5, the staff agrees that actual measured doses to the Fermi 3 construction workers could be lower than the applicant's dose estimates.

B. Airborne Release Dose

Environmental radiological monitoring data obtained from the Fermi 2 Annual Radioactive Effluent Release and Radiological Environmental Operating Reports were used to assess any potential radiological impact from the operation of Fermi 2 on construction workers. The data from these reports are considered representative for the Fermi 3 site construction worker dose evaluations. The dose rates calculated at the Fermi 2 Visitor's Center are considered to be most representative of the gaseous effluent dose rates to which construction workers would be exposed. The radiological data used to calculate the dose rate from gaseous effluents were collected for the years 1999 through 2008. The calculated maximum dose rate that a construction worker would receive from Fermi 2 gaseous releases (based on the maximum dose results from 1999 through 2008) would be 0.016 mSv/yr (1.6 mrem/yr) to the total body and 0.104 mSv/yr (10.4 mrem/yr) to the thyroid. This dose estimate is based on the gaseous releases in calendar year 2001.

The staff finds this annual dose rate reasonable given that recent environmental dose rates are much smaller, as indicated in Table 4.5-2 of the ER in Part 3 of the COL application.

C. Annual Construction Worker Dose

Based on the updated direct dose estimates to construction workers (in response to RAI 12.03-12.04-5, the applicant modified construction worker doses to be based on the readings from TLD Stations T-47 and T-48 instead of on Station T-48 alone), the applicant calculated a maximum annual and hourly dose to a Fermi 3 construction worker from direct radiation sources and gaseous effluents of 0.966 mSv (96.6 mrem) per year and 0.0013 mSv (0.13 mrem) per hour, respectively (ADAMS Accession No. ML101450195). The applicant also updated COL FSAR Subsection 12.4.7.1 by providing a summary of the annual construction worker dose and the information in Section 4.5 of the ER. FSAR Subsection 12.4.7.1 also provides information showing how the estimated doses comply with the applicable requirements in 10 CFR 20.1301; 40 CFR Part 190; and 10 CFR Part 50, Appendix I (for gaseous effluents). The applicant stated that the construction workers are considered to be members of the general public, so radiation monitoring of the Fermi 3 construction workers and compliance with the requirements of 10 CFR Part 20, Subpart D are controlled per the requirements of the Fermi 2 Radiological Effluent Monitoring Plan (REMP).

The staff reviewed and agreed with the applicant's assumptions and updated analyses for doses to construction workers for conformance to 10 CFR 20.1301; 40 CFR Part 190; and 10 CFR Part 50, Appendix I (for gaseous effluents).

Based on the above evaluation, the staff finds the applicant's response to RAI 12.03-12.04-5 acceptable. The staff verified that FSAR Revision 3 includes the applicant's proposed revisions in the response to RAI 12.03-12.04-5. Therefore, RAI 12.03-12.04-5 and RAI 12.03-12.04-3 are closed.

On the basis of the above evaluation, the staff finds that the applicant's estimates of doses to construction workers during the construction of Fermi 3 are within the applicable limits of 10 CFR 20.1301; 40 CFR Part 190; and 10 CFR Part 50, Appendix I (for gaseous effluents). Therefore, the applicant's estimates are acceptable.

12.4.5 Post Combined License Activities

There are no post COL activities related to this section.

12.4.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG-1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the relevant information relating to dose assessment, and no outstanding information is expected to be addressed in the Fermi 3 COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to dose assessments that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in Section 12.3-12.4 of NUREG–0800, and other NRC RGs. The staff also evaluated the applicant's supplemental information to address doses to construction workers using the acceptance criteria in Section 4.5 of NUREG–1555. NUREG-1555 addresses the relevant requirements of 10 CFR Part 20 with respect to occupational and public dose limits. After reviewing the supplemental information, the staff finds it acceptable and in compliance with the applicable portions of 10 CFR Part 20.

12.5 Operational Radiation Protection Program

12.5.1 Introduction

This FSAR section addresses the Operational Radiation Protection Program, which is designed to maintain occupational and public doses below regulatory limits and ALARA. The Operational Radiation Protection Program is designed with the following objective:

> Providing capability for administrative control of the activities of plant personnel to limit personnel exposures to radiation and radioactive materials to levels which are ALARA and within the guidelines of 10 CFR Part 20.

12.5.2 Summary of Application

Section 12.5 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 12.5 of the certified ESBWR DCD Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 12.5, the applicant provides the following:

COL Items

- STD COL 12.5-1-A Equipment, Instrumentation, and Facilities

This DCD COL item requires the applicant to describe radiation protection equipment, instrumentation, and facilities. The applicant references Appendix 12BB, which in turn adopts NEI 07–03A to address the needs of this standard COL item.

- STD COL 12.5-2-A Compliance with 10 CFR 50.34(f)(2)(xxvii) and NUREG–0737 Item III.D.3.3

This DCD COL item requires the applicant to describe portable instruments for measuring radioiodine concentrations under accident conditions, in compliance with the requirements of 10 CFR 50.34(f)(2)(xxvii) and the guidance of NUREG–0737 Item III.D.3.3. The applicant references Appendix 12BB, which in turn adopts NEI 07–03A to address the needs of this standard COL item.

- STD COL 12.5-3-A Radiation Protection Program

This DCD COL item requires the applicant to provide a description of the Operational Radiation Protection Program and to include descriptions of access controls to "Very High Radiation Areas." The applicant references Appendix 12BB, which in turn adopts NEI 07–03A to address the needs of this standard COL item.

Operational Program

- Operational Program Item #10 Radiation Protection Program

DCD Tier 2, Section 13.4 directs the COL applicant to develop and implement the required operational programs. The applicant provides Operational Program Item #10 in FSAR Table 13.4-201, which identifies the program milestones as Commitment (COM13.4-012) through Commitment (COM13.4-015).

12.5.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the Operational Radiation Protection Program, and the associated acceptance criteria, are in Section 12.5 of NUREG-0800.

The staff followed the guidance in RG 1.206 to evaluate Fermi 3 FSAR Section 12.5 for compliance with NRC regulations.

In particular, the regulatory basis for the acceptance of the COL items is established in the following requirements and guidance documents:

- Management and organization are established in RG 1.8, Revision 3, RG 8.2, Revision 1, RG 8.8, Revision 3, and RG 8.10, Revision 1-R; as required by 10 CFR 20.1101 and 10 CFR 20.2102, "Records of radiation protection program."

- Adequate facilities are established in RG 1.97, Revision 4, RG 8.8, Revision 3, RG 8.9, Revision 1, RG 8.15, Revision 1, RG 8.20, Revision 1, "Applications of Bioassay for I-125 and I-131," and RG 8.28; as required by 10 CFR 20.1801, "Security of stored material"; 10 CFR 20.1802, "Control of material not in storage"; and 10 CFR 20.1906, "Procedures for receiving and opening packages."

- Instrumentation and equipment are established in 10 CFR 20.1501, "General"; 10 CFR 20.1502, "Conditions requiring individual monitoring of external and internal occupational dose"; 10 CFR 50.34(f)(2)(xxvii); and the criteria in Item III.D.3.3 of NUREG–0737.

- Training and procedures are established in RG 1.8, Revision 3, RG 1.33, Revision 2, "Quality Assurance Program Requirements (Operation)," RG 8.2, Revision 1, RG 8.7 Revision 2, RG 8.8, Revision 3, and RG 8.10, Revision 1-R; as required by 10 CFR 19.11, "Posting of notices to workers"; 10 CFR 19.12, "Instruction to workers"; and the applicable requirements in 10 CFR Part 20, Part 50, Part 70, and Part 71, "Packaging and Transportation of Radioactive Material."

The regulatory basis for the acceptance of Operational Program #10, which addresses the Radiation Protection Program, is satisfied based on meeting the requirements of 10 CFR 20.1101.

12.5.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 12.5 of the certified ESBWR DCD. The staff reviewed Section 12.5 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to the "Operational Radiation Protection Program."

In addition, the staff reviewed the applicant's proposed resolution to the COL items and the description of the Operational Radiation Protection Program included under Section 12.5 of the Fermi 3 COL FSAR. The staff used the applicable sections of the SRP and RG 1.206 as guidance.

Section 1.2.3 of this SER discusses the NRC's strategy for performing one technical review for each standard issue outside the scope of the DC and to use this review to evaluate the subsequent COL applications. To ensure that the staff's findings on the standard content that were documented in the SER with open items for the North Anna Unit 3 application are equally applicable to the Fermi 3 COL application, the staff undertook the following reviews:

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

- The staff compared the North Anna Unit 3 COL FSAR, Revision 1, to the Fermi 3 COL FSAR, Revision 3. In this comparison, the staff considered changes to the Fermi 3 COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the North Anna SER with open items.

- The staff confirmed that the applicant has endorsed all responses to the RAIs in the corresponding standard content (the North Anna SER) evaluation.

- The staff verified that the site-specific differences are not relevant to this section.

The staff completed the review and finds the evaluation of the North Anna standard content to be directly applicable to the Fermi 3 COL application. This SER identifies the standard content material with italicized, double-indented formatting.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

The following portion of this technical evaluation section is reproduced from Section 12.5.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL12.5-1-A Equipment, Instrumentation, and Facilities*

  The applicant provided additional information in STD COL 12.5-1-A to address the resolution of DCD COL Item 12.5-1-A, which states:

  > *"The COL applicant will provide a description of plant health physics equipment, instrumentation, and facilities."*

  The FSAR states that this COL information item is addressed in NEI template 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description," which is referenced in Appendix 12BB of the FSAR. This template is currently under review by NRC staff. The template thoroughly describes radiation protection facilities and monitoring instrumentation and equipment.

  The radiation protection facilities described in the template include a radiochemistry laboratory, personnel and equipment decontamination facilities, an access control facility, radiation protection offices, portable instrument calibration and respirator facilities, storage and issue areas for contaminated tools and equipment, a machine shop for activated/contaminated components and equipment, radioactive materials storage area, facilities for dosimetry processing and bioassay, and a laundry facility. The ESBWR DCD provides additional information for the personnel decontamination area, radiation protection offices, and a portable instrument calibration facility that is consistent with the template. Equipment to be used for radiation protection purposes includes portable radiation survey instruments, personnel monitoring equipment, fixed and portable area and airborne radioactivity monitors, laboratory equipment, air samplers, respiratory protective equipment, and protective clothing.

The staff finds that the applicant has adequately described the plant health physics equipment, instrumentation, and facilities to resolve DCD COL Item 12.5-1-A.

Since the applicant references this template in addressing the resolution of DCD COL Item 12.5-1-A, the staff cannot consider DCD COL Item 12.5-1-A resolved until the staff approves this template. The applicant has committed to update the FSAR to reference the final version of this template. See Confirmatory Item 12.01-1.

As stated earlier, NRC staff has reviewed and accepted the final revision of the NEI 07–03 template for addressing this COL item. The applicant has adopted the final revision of this template (i.e., NEI 07–03A) in Fermi 3 COL FSAR Appendix 12BB. Therefore, the staff finds that the applicant adequately addresses COL Item STD COL 12.5-1-A (radiation protection equipment, instrumentation, and facilities). Confirmatory Item 12.01-1 is closed.

The following portion of this technical evaluation section is reproduced from Section 12.5.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL 12.5-2-A* — *Compliance with Paragraph 50.34(f)(2)(xxvii) of 10 CFR 50 and NUREG0737 Item III.D.3.3*

The applicant provided additional information in STD COL 12.5-2-A to address the resolution of DCD COL Item 12.5-2-A, which states:

> *"The COL applicant will provide a description of the portable instruments that accurately measure radio-iodine concentrations in plant areas under accident conditions and of the training and procedures on the use of these instruments."*

The FSAR states that this COL information item is addressed in NEI template 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description," which is referenced in Appendix 12BB of the FSAR. This template is currently under review by NRC staff. In order to resolve this COL action item, the licensee must show compliance with 10 CFR 50.34(f)(2)(xxvii) and Item III.D.3.3 of NUREG–0737. 10 CFR 50.34(f)(2)(xxvii) (as supplemented by the criteria in Item III.D.3.3 of NUREG–0737) requires the licensee to provide equipment and associated training and procedures for accurately determining the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident. NEI 07–03 discusses procedures to be used to collect and analyze samples to detect and measure radioiodine. This template states that radiation protection technicians will be trained and qualified under a program established in accordance with 10 CFR 50.120. This training, along with the procedures on radiological surveillance described in NEI 07–03, will ensure that the radiation protection technicians will have the capability of determining the airborne iodine concentrations in areas within the facility where personnel may be present during an accident and for a broad range of routine conditions. Milestone 1.c. of NEI 07–03 ensures that an adequate number of instruments are available to provide for appropriate detection capabilities to conduct radiation surveys in accordance with 10 CFR 20.1501 and 20.1502,

including the capability to determine the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident.

The staff finds that the applicant has provided an adequate description of the portable instruments that accurately measure radio-iodine concentrations in plant areas under accident conditions and of the training and procedures provided on the use of these instruments.

Since the applicant makes reference to this template in addressing the resolution of DCD COL Item 12.5-2-A, the staff cannot consider DCD COL Item 12.5-2-A resolved until the staff approves the template. The applicant has committed to update the FSAR to reference the final version of this template. See Confirmatory Item 12.01-1.

As stated earlier, NRC staff has reviewed and accepted the final revision of the NEI 07–03 template for addressing this COL item. The applicant has adopted the final revision of this template (i.e., NEI 07–03A) in Fermi 3 COL FSAR Appendix 12BB. Therefore, the staff finds that the applicant adequately addresses COL Item STD COL 12.5-2-A (compliance with 10 CFR 50.34(f)(2)(xxvii) and NUREG-0737 Item III.D.3.3). Confirmatory Item 12.01-1 is closed.

The following portion of this technical evaluation section is reproduced from Section 12.5.4 of the North Anna Unit 3 SER (ADAMS Accession No. ML091740254):

- *STD COL 12.5-3-A Radiation Protection Program*

  The applicant provided additional information in STD COL 12.5-3-A to address the resolution of DCD COL Item 12.5-3-A, which states:

  > *"The COL applicant will provide a description of the operational Radiation Protection Program."*

  The FSAR states that this COL information item is addressed in NEI template 07–03, "Generic FSAR Template Guidance for Radiation Protection Program Description," which is referenced in Appendix 12BB of the FSAR. This template is currently under review by NRC staff. The template provides a detailed description of the Radiation Protection Program. See Confirmatory Item 12.01-1.

  NEI template 07–03 contains several bracketed sections that allow for design and site specific deviations or additions. In the review of the COL, the staff noted that the applicant did not address how they would disposition each of these bracketed sections of the template. The staff issued RAI 12.05-2 to determine whether the applicant planned to deviate from or supplement the information provided in the template for each bracketed section. In response to this RAI, the applicant supplemented Appendix 12BB of the FSAR in Revision 1 to state how they will address each bracketed section in NEI 07–03. The staff finds this response acceptable and RAI 12.05-2 is closed.

  As discussed in Section 12.3.1.3 of the North Anna 3 FSAR, access to very high radiation areas is discussed in Section 12.5 of the North Anna 3 FSAR as part of

the operational program for radiation protection. In Section 12.5.3 of the North Anna 3 COL FSAR, the applicant states that the operational program for radiation protection is addressed in Appendix 12BB. Appendix 12BB references NEI 07–03 (which is currently under review by NRC staff) as the generic FSAR template guidance for the description of North Anna's Radiation Protection Program.

Section 12.5.4.4 of NEI 07–03 (specifically the bracketed "Note" portion of Section 12.5.4.4) states that each COL applicant should provide additional plant specific information in the FSAR to describe each Very High Radiation Area (VHRA) and to refer to each location on the plant layout diagrams in FSAR Section 12.3. The description of additional administrative controls for restricted access to each Very High Radiation Area is required by 10 CFR 20.1602. Section 12.5.4.4 of NEI 07–03 also states that applicants need to provide detailed drawings of each VHRA and indicate physical access controls for each of these areas. Since the applicant did not provide the plant-specific information on access controls described in Section 12.5.4.4 of NEI 07–03, the NRC staff issued RAI 12.03/04-2. In response to this RAI, the applicant revised Appendix 12BB of FSAR Revision 1, by adding a description of some physical and administrative access controls that will be used to restrict access to the very high radiation areas at North Anna 3. The applicant's response to RAI 12.03/04-2 did not address all of the plant-specific information on access controls described in Section 12.5.4.4 of NEI 07–03. Therefore, the staff issued RAI 12.03/04-11. This supplemental RAI requested that the applicant to (1) provide a listing and location of all designated VHRAs in the plant, (2) describe why each of these areas would need to be accessed, and (3) provide a description of the physical barriers (and a description of how these barriers will be verified in the final design of the facility) used to preclude inadvertent access to these areas. In the applicant's response to RAI 12.03/04-11, the applicant committed to add a table to the FSAR listing all accessible VHRAs in the plant, the conditions under which each area will be designated a VHRA, and the area's location on the DCD plant layout drawings. The applicant also committed to modify the FSAR to specify the administrative requirements for accessing each of these VHRAs. Finally, the applicant committed to modify the FSAR to describe the physical barriers in place to prevent inadvertent access to each of the identified VHRAs. The existence of these barriers will be verified via ITAAC as identified in DCD Tier 1 Table 2.5.10-1. The applicant will amend Section 12.5.4.4 of the FSAR [Appendix 12BB] to reference sections of the ESBWR DCD that identify the physical controls, interlocks, and annunciators used to control access to areas immediately adjacent to the Inclined Fuel Transfer System (IFTS). These areas are immediately adjacent to the IFTS, and they become VHRAs during the transfer of spent fuel in the IFTS. The staff finds that the applicant's response to this RAI is acceptable. However, since the applicant will incorporate the response to this RAI in a future amendment to the FSAR, the staff considers the applicant's response to RAI 12.03/04-11 to be confirmatory. This is Confirmatory Item 12.03/04-11.

In Fermi 3 COL FSAR Revision 2, the applicant referenced NEI 07–03 in Appendix 12BB for addressing access controls to the very high radiation areas (VHRAs) as part of the response to resolve COL Item STD COL 12.5-3-A. As stated earlier, NRC staff has reviewed and accepted the final revision of the NEI 07–03 template for addressing this COL item. The applicant is

committed to adopting the final revision of this template in the COL FSAR. NEI issued the final revision of this template as NEI 07–03A, Revision 0 (ADAMS Accession No. ML091490684).

Subsection 12.5.4.4 of NEI 07–03A specifies that the COL applicant should provide (1) a list of all VHRAs and references to their locations on plant layout diagrams; (2) the anticipated frequency of accessing each of the VHRAs and the means for restricting access to these areas; and (3) detailed drawings for each VHRA that show physical barriers in place to restrict access to these areas; or if such detailed drawings are not available, describe how the barriers will be verified in the final design of the facility. In FSAR Revision 2, Appendix 12BB, Subsection 12.5.4.4, the applicant referenced DCD Tier 2, Section 12.3 for isometric drawings of the VHRA and listed various means of access controls. However, there are no isometric drawings of the VHRA in DCD Tier 2, Section 12.3. Therefore, NRC staff informed the applicant of this shortcoming and inconsistency with the standard response in the North Anna Unit 3 review, and requested the applicant to revise FSAR Appendix 12BB and provide the additional information specified in Subsection 12.5.4.4 of NEI 07–03A. The applicant proposed to revise Appendix 12BB in FSAR Revision 3, which in turn adopts NEI 07–03A to address the needs of this COL item and to include the requested information. The staff verified that FSAR Revision 3 includes additional text regarding the bracketed items in Subsection 12.5.4.4 of NEI 07–03A, and identifies the plant VHRAs consistent with the closure of the Standard RAI 12.03/04-11. Therefore, the staff finds that the applicant adequately addresses COL Item STD COL 12.5-3-A (description of the Radiation Protection Program that includes a description of access control to "Very High Radiation Areas"). Confirmatory Item 12.03/04-11 is closed.

Operational Program

- Operational Program Item #10 Radiation Protection Program

In FSAR Table 13.4-201, the applicant lists four milestones and the associated implementation schedules for Operational Program Item #10. The Radiation Protection Program is required by 10 CFR Part 20.1101. The four listed milestones are:

1. Prior to initial receipt of byproduct, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18) for those elements of Radiation Protection (RP) Program necessary to support such receipt [COM 13.4-012].

2. Prior to fuel receipt for those elements of RP Program necessary to support receipt and storage of fuel onsite [COM 13.4-013].

3. Prior to fuel load for those elements of Radiation Protection Program necessary to support fuel load and plant operation [COM 13.4-014].

4. Prior to the first shipment of radioactive waste for those elements of the Radiation Protection Program necessary to support shipment of radioactive waste [COM 13.4-015].

The applicant proposed Commitment (COM 13.4-012) through Commitment (COM 13.4-015) as license conditions for tracking these four milestones (ADAMS Accession No. ML11229A767). The Radiation Protection Program is composed of a number of elements that are described in NEI 07–03A. Because the applicant incorporates by reference NEI 07–03A into FSAR Appendix 12BB, the staff finds these program milestones acceptable. For operational program

readiness in Section 3.6 of Part 10 of the COL application, the applicant (in response to RAI 19.03-38 dated August 16, 2011 [ADAMS Accession No. ML11229A767]), added a general implementation plan for operational programs, which are listed in Table 13.4-201, stating that:

> The licensee shall submit to the appropriate director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first.

The staff finds the applicant's general implementation plan for operational programs in Table 13.4-201 to be consistent with the guidance in SECY-05-197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria." In addition, in FSAR Appendix 12BB, the applicant incorporates by reference NEI 07–03A (which provides the Radiation Protection Program milestones). Therefore, the staff finds that the applicant adequately addresses Operational Program Item #10.

12.5.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the staff identifies the following two license conditions:

- License Condition (12.5-1) – The licensee shall implement the Radiation Protection Program (RPP), (including the ALARA principle) or applicable portions thereof, on or before the associated milestones identified below:

  a. Receipt of Materials – Prior to initial receipt of byproduct, source, or special nuclear materials onsite (excluding exempt quantities as described in 10 CFR 30.18, "Exempt quantities.")

  b. Fuel Receipt – Prior to initial receipt and storage of fuel onsite

  c. Fuel Loading – Prior to initial fuel load

  d. Waste Shipment – Prior to first radioactive waste shipment

- License Condition (12.5-2) – No later than 12 months after issuance of the COL, the licensee shall submit to the Director NRO a schedule that supports planning for and conduct of NRC inspections of the operational program (Radiation Protection Program). The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until this operational program has been fully implemented.

12.5.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the relevant information relating to the Operational

Radiation Protection Program, and no outstanding information is expected to be addressed in the Fermi 3 COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the Operational Radiation Protection Program that were incorporated by reference are resolved.

In addition, the staff compared the additional information in the COL application to the relevant NRC regulations, the guidance in Section 12.5 of NUREG–0800, and other pertinent NRC RGs. The staff's review concludes that the applicant has adequately addressed the COL items relating to the Operational Radiation Protection Program; radiation protection equipment, instrumentation, and facilities; and portable instruments to measure radio-iodine concentrations under accident conditions. The applicant also listed Operational Program Item #10, which pertains to the Radiation Protection Program and its implementation milestones, in FSAR Table 13.4-201. The overall description of the applicant's operational program for radiation protection is in FSAR Appendix 12BB, which references NEI 07–03A. An acceptable Radiation Protection Program meets the requirements of 10 CFR 19.12, 10 CFR 19.13, and 10 CFR Part 20; and the applicable sections of 10 CFR Parts 50, 52, and 71. On the basis of the staff's review of the applicant's Operational Radiation Protection Program described above, the staff finds the applicant's Operational Radiation Protection Program and the associated milestones to be acceptable.

12.6 Appendices 12A and 12B – Calculations of Airborne Radionuclides and Airborne Releases

Appendices 12A and 12B of the Fermi 3 COL FSAR, Revision 7, incorporate by reference Appendix 12A, "Calculation of Airborne Radionuclides;" and Appendix 12B, "Calculation of Airborne Releases;" of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E with no departures or supplements. NRC staff reviewed the application and checked the referenced DCD to ensure that no issues relating to these appendices remain for review.[1] The NRC staff's review confirms that there are no outstanding issues related to these appendices. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to Appendices 12A and 12B are resolved.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

13.0 CONDUCT OF OPERATIONS

This chapter provides information relating to the preparations and plans for the design, construction, and operation of a nuclear plant. The purpose of this chapter is to provide reasonable assurance that the combined license (COL) applicant will establish and maintain a staff of adequate size and technical competence to ensure that the operating plans the licensee will follow are adequate to protect public health and safety.

13.1 Organizational Structure of Applicant

13.1.1 Introduction

This section of the COL Final Safety Analysis Report (FSAR), Revision 7 describes the organizational structure that includes the design, construction, and preoperational responsibilities of the organizational structure. The management and technical support organization includes a description of the corporate or home office organization, its functions and responsibilities, and the number and qualifications of the personnel. The activities of the organizational structure include facility design, design review, design approval, construction management, testing, and the operation of the plant. Descriptions of the design, construction, and preoperational responsibilities include the following:

- How those in charge at the headquarters will assign and implement these responsibilities within the organizational units.
- The responsible working or performance-level organizational unit.
- The estimated number of persons to be assigned to each unit with responsibility for the project.
- The general level of education and experience required for identified positions or classes of positions.
- Early plans to provide technical support for the operation of the facility.

This section also describes the structure, functions, and responsibilities of the onsite organization established to operate and maintain the plant. In addition, the applicant renumbered Section 13.1.1 and added other subsections in FSAR Section 13.1. Several of these subsections are new and differ from the structure in Section 13.1 of Regulatory Guide (RG) 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition).”

13.1.2 Summary of Application

Section 13.1 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 13.1 of the certified Economic Simplified Boiling-Water Reactor (ESBWR) Design Control Document (DCD), Revision 10. In addition, in FSAR Section 13.1, the applicant provided the following:

COL Items

- EF3 COL 13.1-1-A Management and Technical Support Organization

EF3 COL 13.1-1-A provides site-specific information to resolve DCD COL 13.1-1-A, which requires the COL applicant to describe the organizational structure. EF3 COL 13.1-1-A describes organizational positions at the nuclear power station and in the owner/applicant corporations, in addition to the associated functions and responsibilities.

- EF3 COL 9.5.1-10-A Fire Brigade

EF3 COL 9.5.1-10-A is the Fermi 3 response to DCD COL 9.5.1-10-A, which requires the COL applicant to provide a milestone for implementing in all plant areas manual firefighting capability provisions.

13.1.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed in NUREG-1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor Standard Design," (the FSER related to the ESBWR DCD). In addition, the relevant requirements of the Commission regulations for the applicant's organizational structure, and the associated acceptance criteria, are in Subsections 13.1.1 and 13.1.2-13.1.3 of NUREG–0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," the Standard Review Plan (SRP).

The applicable regulatory guidance for the applicant's organizational structure is as follows:

- American National Standards Institute (ANSI)/American Nuclear Society (ANS)-3.1-1993, as endorsed and amended by RG 1.8, "Qualification and Training of Personnel for Nuclear Power Plants."

The applicable regulations and regulatory guidance for the management, technical support, and operating organizations of the applicant are as follows:

- Title 10 of the *Code of Federal Regulations* (10 CFR) 50.40(b), "Common standards"
- 10 CFR 50.54 "Conditions of licenses" items (j) through (m)
- RG 1.33, Revision 2, "Quality Assurance Program Requirements (Operation)"

13.1.4 Technical Evaluation

As documented in NUREG–1966, U.S. Nuclear Regulatory Commission (NRC) staff reviewed and approved Section 13.1 of the certified ESBWR DCD. The staff reviewed Section 13.1 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information relating to the applicant's organizational structure.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

The staff reviewed the information in the COL FSAR:

COL Items

- EF3 COL 13.1-1-A Management and Technical Support Organization

EF3 COL 13.1-1-A is related to the organizational structure of the COL applicant. This COL item describes organizational positions and associated functions and responsibilities at a nuclear power plant and in the corporations of the owner/applicant.

In this item, the applicant provides additional Fermi 3 site-specific COL information to resolve DCD COL Item 13.1-1-A, which addresses the organizational structure of the COL applicant and states:

> The COL Applicant referencing the ESBWR will submit documentation that demonstrates that their organizational structure is consistent with the ESBWR Human Factors Engineering (HFE) design requirements and complies with the requirements of 10 CFR 50.54 (i) through (m).

The applicant provides additional information as part of the FSAR to describe the organizational positions, and associated functions and responsibilities, at a nuclear power station and in the corporations of the owner/applicant. The applicant states that Table 13.1-201, "Generic Position/Site Specific Position Cross Reference," includes the estimated number of positions required for each function and a cross-reference to identify site-specific position titles.

The applicant adds new sections and tables related to the site-specific organizational structure in Section 13.1. The new information extends beyond the structure in RG 1.206. The new sections and titles are as follows:

13.1.1 "Management and Technical Support Organization"
13.1.1.1 "Design, Construction, and Operating Responsibilities"
13.1.1.2 "Technical Support for Plant Operations"
13.1.1.3 "Organizational Arrangement"
13.1.1.4 "Qualifications of Technical Support Personnel"
13.1.2 "Operating Organization"
13.1.2.1 "Plant Organization"
13.1.3 "Qualifications Requirements of Nuclear Plant Personnel"
13.1.3.1 "Minimum Qualifications Requirements"
13.1.3.2 "Qualification Documentation"

Table 13.1-201, "Generic Position/Site Specific Position Cross Reference"
Table 13.1-202, "Minimum Shift Staffing"

In addition, the applicant added a new appendix to Chapter 13 for future designation as historical information titled, "Appendix 13AA Design and Construction-Responsibilities." This appendix describes the applicant's construction organization.

The staff reviewed EF3 COL 13.1-1-A and concludes that the descriptions of the management, technical support, and operating organizations are acceptable and meet the requirements of 10 CFR 50.40(b) and 10 CFR 50.80, “Transfer of licenses,” as applicable. This conclusion is based on the following:

The applicant has identified the structure of the organization and has functionally described how the organization will communicate, implement, manage, and provide technical support for the design, construction, and operation of the facility. The applicant also described plans for managing the project in addition to the role and function of the architect-engineer and the nuclear steam supply system vendor during both the design and construction phases. These plans provide reasonable assurance that the applicant will establish an acceptable organization with sufficient resources and experience that will be available for offsite technical support. These plans thus satisfy the applicant’s ability to fulfill commitments for the design, construction, and operation of the facility.

The applicant also describes the assignment of plant operating responsibilities; the reporting chain up through the chief executive officer; the functions and responsibilities of each major plant staff group; the proposed shift crew complement for single-unit operation; the qualification requirements for members of the plant staff; and staff qualifications. Résumés for management and principal supervisory and technical positions will be available for review after position vacancies are filled.

In addition, the applicant's operating organization can be characterized as follows:

1. Based on the preceding information and experience in nuclear power plant design, construction, and operation, the applicant is technically qualified as specified and as applicable in 10 CFR 50.40(b) and 10 CFR 50.80.

2. An adequate number of licensed operators will be available at all required times to satisfy the minimum staffing requirements of 10 CFR 50.54(m).

3. On-shift personnel will be able to provide an initial facility response in the event of an emergency.

4. Organizational requirements for the plant manager and radiation protection manager have been satisfied.

5. Qualifications and requirements of plant personnel conform to the guidance of RG 1.8.

6. Organizational requirements conform to the guidance of RG 1.33.

7. The applicant has satisfied the requirements that a designated organization be responsible for the testing program and for plans to utilize the plant operating and technical staff to develop and conduct the testing program and to review the test results.

These findings contribute to the judgment that the applicant complies with the requirements of 10 CFR 50.40(b). That is, the applicant is technically qualified to engage in design and construction activities and to operate a nuclear power plant; the applicant will have the necessary managerial and technical resources to support the plant staff in the event of an emergency; and the applicant identifies the organizational positions responsible for fire protection matters and delegates to these positions the authority to implement fire protection requirements.

FSAR Table 1.9-201, "Conformance with Standard Review Plan," identifies an exception to NUREG-0800, Section 13.1.1, SRP Acceptance Criterion 1.C, as follows:

> The experience requirements of corporate staff are set by corporate policy and not provided in detail; however, the experience level of Detroit Edison, as discussed in Section 13.1 and Appendix 13AA, in the area of nuclear plant development, construction, and management establishes that Detroit Edison has the necessary capability and staff to ensure that design and construction of the facility will be performed in an acceptable manner.

As part of the guidance in NUREG–0800, Areas of Review Item 1.B.vii in Section 13.1.1 states that the submittal should describe the general education and experience required for identified positions or classes of positions and for management and supervisory positions. The staff found that Detroit Edison has addressed the corporate staff guidance for education and experience as recommended in NUREG–0800, Section 13.1.1 Areas of Review Item 1.B.vii.

The applicant has added new FSAR Subsection 13.1.1.4, which states that the qualifications for managers and supervisors in the technical support organization will meet the requirements for education and experience described in ANSI/ANS-3.1–1993 and RG 1.8. The applicant also notes that corporate policy sets the qualification and experience requirements of the corporate staff, which are not provided in detail.

FSAR Subsection 13.1.3.1 states that the qualifications for managers, supervisors, operators, and technicians in the operating organization meet the requirements for education and experience as described in ANSI/ANS-3.1-1993 and endorsed and amended in RG 1.8. For reactor operators (ROs) and senior reactor operators (SROs), Section 13.2 of the COL FSAR modifies those requirements. In addition, for initial appointees to appropriate management and supervisory positions, Subsection 13.1.3.2 states that résumés and other documentation of qualifications and experience will be available for review after vacant positions are filled.

In FSAR Table 13.1-202, "Minimum Shift Staffing for Unit 3," the applicant describes the minimum composition of the operating shift crew for unit shutdown and operating modes. Position titles, license requirements, and minimum shift staffing for the various modes of operation are in technical specifications and administrative procedures.

- EF3 COL 9.5.1-10-A Fire Brigade

EF3 COL 9.5.1-10-A is related to onsite fire operations training and the schedule for implementation of the fire protection program. Based on the information provided in Table 13.4-201, "Operational Programs Required by NRC Regulations," the staff finds that the applicant's schedule for implementing the fire protection plan meets the guidance of

NUREG-0800 and is therefore acceptable. The technical review for EF3 COL 9.5.1-10-A, as it relates to the fire protection programmatic requirements, is in Section 9.5 of this SER.

13.1.5 Post Combined License Activities

There are no post COL activities related to this section.

13.1.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

In addition, the staff compared the additional information in the COL application to the relevant NRC regulations, the guidance in Section 13.1 of NUREG–0800, and other NRC RGs. The staff's review concludes that the applicant has provided sufficient information to satisfy the requirements of NRC regulations. The staff determined that the applicant has adequately addressed EF3 COL Item 13.1-1-A involving the management, technical support, and operating organizations; and EF3 COL 9.5.1-10-A as it relates to the implementation of the Fermi 3 Fire Protection Program, including the Fire Brigade. In conclusion, the staff determined that the applicant has provided sufficient information to satisfy the requirements of 10 CFR 50.40(b), 10 CFR 50.54(j–m), and 10 CFR 50.80; and no outstanding information is expected to be addressed in the COL FSAR related to this section.

13.2 Training

13.2.1 Introduction

This section of the FSAR Revision 7 includes a description of and schedule for the program to train ROs and SROs (i.e., licensed operators). The discussion addresses the scope of the licensing examinations as well as training requirements. The licensed operator training program also incorporates the requalification programs required in 10 CFR 50.54(i)(i-1) and 10 CFR 55.59, "Requalification."

In addition, this section provides a description of and schedule for the program to train non-licensed plant staff.

13.2.2 Summary of Application

Section 13.2 of the Fermi 3 COL FSAR, Revision 7 incorporates by reference Section 13.2 of the certified ESBWR DCD, Revision 10. In addition, in FSAR Section 13.2, the applicant provides the following:

COL Items

- STD COL 13.2-1-A Reactor Operator Training

In FSAR Section 13.2.1, "Reactor Operator Training," the applicant states:

> Descriptions of the training program and licensed operator requalification program for ROs and SROs are addressed in Appendix 13BB. A schedule showing approximate timing of initial licensed operator training relative to fuel loading is addressed in FSAR Section 13.1, Table 13.1-202, Nominal Plant Staff Hiring and Training Schedule. Requalification training is implemented in accordance with FSAR Section 13.4, Table 13.4-201, Operational Programs Required by NRC Regulations.

- STD COL13.2-2-A Training for Non-Licensed Plant Staff

In FSAR Section 13.2.2, "Training for Non-Licensed Plant Staff," the applicant states:

> A description of the training program for non-licensed plant staff is in FSAR Appendix 13BB, Training Program. A schedule showing the approximate timing of initial training for non-licensed plant staff relative to fuel loading is in FSAR Section 13.1, Table 13.1-202, Nominal Plant Staff Hiring and Training Schedule.

Supplemental Information

- STD SUP 13.2-1 Training

In FSAR Section 13.2 the applicant states:

> Training programs are discussed in Appendix 13BB. Implementation milestones are discussed in COL FSAR Section 13.4.

13.2.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for training, and the associated acceptance criteria, are in Section 13.2 of NUREG–0800.

In particular, the regulatory basis for accepting the applicant's information in Section 13.2 is in 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigation"; Part 26, "Fitness for Duty Programs"; Part 50, "Domestic Licensing of Production and Utilization Facilities"; Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants"; and Part 55, "Operator's Licenses"; Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," of 10 CFR Part 50; the guidance of RG 1.8 and RG 1.149, Revision 3, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations"; NUREG–1021, "Operator Licensing Examination Standards for Power Reactors"; and NUREG–1220, "Training Review Criteria and Procedures." The COL and supplemental information items are reviewed using the guidance in NUREG–0800, Section 13.2.1, "Reactor Operator Requalification Program; Reactor Operator Training," and Section 13.2.2, "Non-Licensed Plant Staff Training."

The Operational Program for the Non-Licensed Plant Staff Training Program is in 10 CFR 50.120, "Training and qualification of nuclear power plant personnel," and 10 CFR 52.79(a)(33).

The Operational Program for the Reactor Operator Training Program is in 10 CFR 55.13, "General exemption"; 10 CFR 55.31, "How to apply"; 10 CFR 55.41, "Written examinations: Operators"; 10 CFR 55.43, "Written examinations: Senior operators"; and 10 CFR 55.45, "Operating tests."

The Operational Program for the Reactor Operator Requalification Program is satisfied based on meeting the requirements of 10 CFR 52.79(a)(34), 10 CFR 50.54(i), and 10 CFR 55.59.

The relevant criteria for reviewing COL items—which relate to the incorporation of operating experience—are based on meeting the provisions of Three Mile Island Action Item I.C.5, Appendix 1A, "Feedback of Operating Experience"; and the guidance of NUREG-0800, Section 13.2, "Training."

13.2.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 13.2 of the certified ESBWR DCD. The staff reviewed Section 13.2 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information contained in the application and the information incorporated by reference address the relevant information related to this section.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

- STD COL 13.2-1-A Reactor Operator Training

The applicant provides additional information in STD COL Item 13.2.1-A, which states:

> Descriptions of the training program and licensed operator requalification program for ROs and SROs are addressed in Appendix 13BB. A schedule showing approximate timing of initial licensed operator training relative to fuel loading is addressed in Section 13.1. Requalification training is implemented in accordance with Section 13.4.

In NUREG–0800, Section 13.2.1 states that the application should contain a description of the training program for ROs and SROs. In FSAR Appendix 13BB, the applicant references the Nuclear Energy Institute (NEI), "Technical Report on a Template for an Industry Training Program Description," NEI 06–13A, a generic training program description. The staff determined that NEI 06-13A, Revision 1, provides an acceptable template for describing licensed operator and non-licensed plant staff training programs because it meets the criteria of NUREG-0800, Section 13.2.1.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

Section 13.2.1 of NUREG–0800 states that the application should describe the schedule for the RO and SRO training program. NEI 06-13A addresses training program schedules in Section 1, "Training Program Description." In FSAR Section 13.1, "Organizational Structure of Applicant," the applicant includes a schedule showing the approximate timing of initial licensed operator training relative to fuel loading. The staff concluded that the applicant's licensed operator training program schedule contains sufficient information to satisfy the guidance of NUREG-0800, Section 13.2.1 and is therefore acceptable.

Section 13.2.1 of NUREG–0800 states that the application should describe the requalification program for ROs and SROs. NEI 06-13A, Section 1 addresses the requalification program descriptions. In FSAR Section 13.4, "Operational Program Implementation," the applicant describes the licensed operator requalification program. The staff concluded that the applicant's description of the licensed operator requalification program meets the criteria in NUREG–0800, Section 13.2.1 and is therefore acceptable.

- STD COL 13.2-2-A Training for Non-Licensed Plant Staff

The applicant provides additional information to address STD COL 13.2-2-A, which states:

> A description of the training program for non-licensed plant staff is addressed in Appendix 13BB. A schedule showing approximate timing of initial training for non-licensed plant staff relative to fuel load is addressed in Section 13.1.

In NUREG–0800, Section 13.2.2 states that the applicant's training program should meet the guidelines of RG 1.8 for non-licensed personnel. In FSAR Table 13.4-201, the applicant provides a schedule for a milestone of at least 18 months before fuel loading for the requirements of non-licensed plant staff, in accordance with the requirements of 10 CFR 50.120(b). In addition, the applicant will provide a schedule for conducting formal onsite training and on-the-job training, so that the entire plant staff will be qualified before initial fuel loading. In FSAR Table 13.4-201, Operational Program Items 11 through 13 provide additional details on the commitments and applicable requirements to be met. The staff determined that the applicant's approach is acceptable because it will include those subjects that are required by regulations for the training programs and will base the training programs on the systems approach to training (SAT), as required by regulations and in accordance with the guidance of NEI 06-13A. The staff concluded that the applicant has provided sufficient information to satisfy the guidance of NUREG–0800, Section 13.2.2.

Supplemental Information

- STD SUP 13.2-1 Training

The applicant provides additional information in FSAR Section 13.2, which states:

> Training programs are addressed in Appendix 13BB. Implementation milestones are addressed in Section 13.4.

The applicant adds FSAR Appendix 13BB, which references NEI 06-13A. However, the applicant does not identify the appropriate NEI 06–13A revision to be used. For example, Revision 0 to NEI 06-13A does not address a cold license training program. Thus, Appendix 13BB does not address provisions for a cold license training plan. Revision 1 to

NEI 06-13A addresses a cold license training program and has been endorsed by the NRC. Therefore, the staff issued Request for Additional Information (RAI) 13.02.01-1 asking the applicant to explain how Fermi operators will be trained and licensed without a cold license training program. The applicant's response to this RAI dated November 4, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML093130117), clarifies the use of Revision 1 to NEI 06–13A as indicated in FSAR Table 1.6-201, "Referenced Topical Reports." The staff found this response acceptable, and therefore, this RAI 13.02.01-1 is closed.

Section 13.2.1 of NUREG–0800 states that the description of the training program should address the subject matter, duration, organization, position titles, and schedules. Section 1 of NEI 06-13A includes information on subject matter, duration, organization, position titles, and schedules. The staff concluded that the description of the NEI 06-13A training program provides sufficient information to satisfy the criteria in Section 13.2.1 of NUREG–0800 and is therefore acceptable.

Section 13.2.1 of NUREG–0800 states that the training program for licensed operators should include (1) the subjects in 10 CFR 55.31, 10 CFR 55.41, 10 CFR 55.43, 10 CFR 55.45, and RG 1.8; and (2) provisions for upgrading licenses. In addition, this program should use the Systematic Approach to Training (SAT) as defined in 10 CFR 55.4, "Definitions." NEI 06-13A, Section 1.1 states that the training program for licensed operators is in accordance with and includes the subjects in 10 CFR Part 55—specifically 10 CFR 55.41, 10 CFR 55.43, 10 CFR 55.45, and RG 1.8. NEI 06-13A, Section 1 states that training programs are developed, established, implemented, and maintained using the SAT, as defined by 10 CFR 55.4. The staff determined that this program is acceptable and meets the guidance of NUREG–0800, Section 13.2.1, because the applicant will include in the training programs those subjects that are required by regulations and will base the training programs on the SAT, as required by regulations and in accordance with the guidance in NEI 06-13A.

Section 13.2.1 of NUREG–0800 also states that the licensed operator requalification program should include the content described in 10 CFR 55.59 or should be based on the use of the SAT, as defined in 10 CFR 55.4. Section 1.1 of NEI 06-13A states that the licensed operator training program content and schedule should comply with 10 CFR 55.59. This section also states that training programs are developed, established, implemented, and maintained using the SAT, as defined by 10 CFR 55.4. The staff found this information acceptable because the applicant will include in the training programs those subjects that are required by regulations and will base the training programs on the SAT, as required by regulations and in accordance with the guidance in NEI 06-13A. The staff concluded that the applicant has provided sufficient information to satisfy NUREG–0800, Section 13.2.1.

In addition, Section 13.2.1 of NUREG–0800 states that the program for providing the simulator capability should meet the requirements described in 10 CFR 55.31, 10 CFR 55.45, 10 CFR 55.46, "Simulation facilities," and 10 CFR 50.34(f)(2)(i); in addition to the guidance in RG 1.149. NEI 06-13A, Section 1.1 states that licensed operators will receive plant simulator training to demonstrate an understanding of and the ability to perform the actions listed in 10 CFR 55.45. NEI 06-13A, Section 1.1 also states that a simulator will be used for training licensed operators and for the administration of operating tests, in accordance with 10 CFR 55.46. NEI 06-13A also references RG 1.149. NEI 06-13A does not specifically mention 10 CFR 55.31 but does address how applicants will apply simulators for licensed operator training, which is in 10 CFR 55.31(a)(5) and addresses the simulator capability. NEI 06-13A also does not mention

10 CFR 50.34(f)(2)(i), which requires simulators to include the capability of simulating small-break, loss-of-coolant accidents. However, FSAR Table 1.9-202, "Conformance with Regulatory Guides," states that the applicant does conform to the guidance of RG 1.149, Revision 3. The staff determined that this information is acceptable because the applicant will provide the simulator capability required by the regulation. The staff concluded that the applicant has provided sufficient information to satisfy NUREG–0800, Section 13.2.1.

Section 13.2.1 of NUREG–0800 states that the training program should include the means for evaluating the effectiveness of the training program in accordance with the SAT. NEI 06-13A Section 1.5 includes a program to evaluate training effectiveness. NEI 06-13A Section 1 also states that training programs are to be developed, established, implemented, and maintained using the SAT as defined by 10 CFR 55.4. The staff determined that this information is acceptable and sufficient to satisfy NUREG–0800, Section 13.2.1, because the applicant will provide a means for evaluating the effectiveness of the training program as recommended by NUREG–0800, Section 13.2.1.

Section 13.2.1 of NUREG–0800 states that applicants are to provide implementation milestones for the RO training program. NEI 06-13A includes implementation milestones. The staff determined that this information is acceptable because the applicant has provided implementation milestones as recommended by NUREG–0800, Section 13.2.1.

13.2.5 Post Combined License Activities

There are no post COL activities related to this section.

13.2.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

In addition, the staff compared the additional COL and supplemental information in the application to the relevant NRC regulations; the guidance in Section 13.2 of NUREG-0800, and other NRC RGs. The staff's review concludes that the applicant has adequately addressed COL Items STD COL 13.2-1-A and 13.2-2-A and Supplemental Information STD SUP 13.2-1 relating to training, in accordance with NRC regulations. These items are thus acceptable.

13.3 Emergency Planning

13.3.1 Introduction

This FSAR section addresses the plans, design features, facilities, functions, and equipment necessary for radiological emergency planning (EP) that must be considered in a COL application. This includes both the applicant's onsite emergency plan and State and local offsite emergency plans, which the NRC and the Federal Emergency Management Agency (FEMA) evaluated for adequacy and a reasonable assurance that they can be implemented. The plans shall be an expression of the overall concept of operations, describe the essential elements of

advanced planning that have been considered, and the provisions that have been made to cope with radiological emergency situations.

13.3.2 Summary of Application

Section 13.3 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 13.3 of the certified ESBWR DCD, Revision 10. In addition, in FSAR Section 13.3, the applicant provides the following:

COL Items

- STD COL 13.3-1-A — Identification of OSC and Communication Interfaces with Control Room and TSC.

The applicant provided additional information in FSAR Section 13.3 to address COL Item 13.3-1-A of the ESBWR DCD, which states:

> The COL applicant is responsible for identifying the [operational support center] OSC and the communication interfaces or inclusion in the detailed design of the control room and [technical support center] TSC (Section 13.3).

- STD COL 13.3-2-A — Identification of EOF and Communication Interfaces with Control Room and TSC.

The applicant provided additional information in FSAR Section 13.3.2 to address COL Item 13.3-2-A of the ESBWR DCD, which states:

> The COL applicant is responsible for the design of the communication system located in the EOF in accordance with NUREG-0696, (Reference 13.3-2), (Section 13.3).

- STD COL 13.3-3-A — Decontamination Facilities.

The applicant provided additional information in Section 13.3.2 to address COL Item 13.3-3-A of the ESBWR DCD, which states:

> The COL applicant will provide supplies at the site for decontamination of onsite individuals in the service building adjacent to the main change rooms (Section 13.3).

Supplemental Information

Part 5, Revision 4, "Emergency Plan," of the Fermi 3 COL application, includes the following:

> Onsite Emergency Plans
>
> Part 5, "Emergency Planning," of the Fermi 3 COL application includes the Emergency Plan (the Fermi 3 Emergency Plan). The Fermi 3 Emergency Plan consists of a basic plan and seven appendices. The seven appendices provide additional detailed information regarding various aspects of the Fermi 3 Emergency Plan.

Offsite Emergency Plans

Part 5, "Emergency Planning," of the Fermi 3 COL application includes current State and local emergency plans. In addition, Part 5 includes the detailed evacuation time estimate (ETE) report.

ITAAC

Part 10, Revision 4, "ITAAC," inspections, tests, analyses, and acceptance criteria (ITAAC) of the Fermi 3 COL application, provides information regarding Emergency Planning – inspections, tests, analyses and acceptance criteria (EP-ITAAC). The ITAAC are evaluated in Section 13.3C.19 of this SER. The applicant provided the following standard supplement in Chapter 14:

STD SUP 14.3-1-A

The COL applicant shall provide Emergency Planning inspections, tests, analyses, and acceptance criteria (ITAAC), based on industry guidance.

License Conditions

- Part 2, License Condition

The applicant proposed a license condition [COM 13.4-031] to submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07-01, Revision 0, "Methodology for Development of Emergency Action Levels Advanced Passive Light Water Reactors," with no deviations. The fully developed site-specific EAL scheme shall be submitted to the NRC for confirmation at least 180 days prior to initial fuel load.

- Part 10, License Condition

In Part 10, Revision 4, of the Fermi 3 COL application, the applicant proposes a license condition to execute formal Letters of Agreement with State and local agencies with responsibilities prior to fuel load.

In Part 10, Revision 4, of the Fermi 3 COL application the applicant proposed a license condition to submit a detailed analysis of on-shift staffing, in accordance with NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," Revision 0, and the licensee shall incorporate any changes to the Emergency Plan needed to bring staff to the required levels, prior to or concurrent with completion of Emergency Plan ITAAC 2.0 of Emergency Plan ITAAC Table 2.3.1, and no less than 180 days prior to initial fuel load.

13.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG-1966. In addition, the relevant requirements of the Commission regulations for EP, and the associated acceptance criteria, are in Section 13.3 of NUREG-0800.

The applicable regulatory requirements and guidance for the Emergency Plan are as follows:

- 10 CFR 52.79(a)(21) and 10 CFR 52.79(a)(22)(i) require the FSAR to include emergency plans that comply with the requirements of 10 CFR 50.47 and Appendix E to 10 CFR Part 50, in addition to certifications from State and local governmental agencies with Emergency Plan responsibilities. Under 10 CFR 50.47(a)(1)(ii), no initial COL under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. In addition, under 10 CFR 50.47(a)(2), the NRC will base its finding on a review of the FEMA findings and determinations as to whether State and local emergency plans are adequate and demonstrate reasonable assurance that they can be implemented and on the NRC assessment as to whether the applicant's onsite emergency plans are adequate and demonstrate reasonable assurance that they can be implemented.

- 10 CFR 52.77, "Contents of applications; general information," 10 CFR 52.80, 10 CFR 50.33(g), and 10 CFR 100.21, "Non-seismic Sitting Criteria."

- NUREG-0800 identifies NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," and other related guidance. The related acceptance criteria are identified in NUREG-0800 Section 13.3.II, "Acceptance Criteria." The applicable regulatory guidance for reviewing emergency preparedness as an operational program is established in NUREG-0800, Section 13.4.

- In addition, Appendix A to 44 CFR 353, "Memorandum of Understanding (MOU) Between Federal Emergency Management Agency and Nuclear Regulatory Commission Relating to Radiological Emergency Planning and Preparedness," September 14, 1993, states that FEMA is responsible for findings and determinations as to whether offsite emergency plans are adequate and can be implemented. FEMA radiological emergency preparedness (REP) guidance documents provide guidance on various topics for use by State and local organizations responsible for REP and response. NUREG-0654/FEMA-REP-1, Revision 1, includes guidance that provides a basis for State and local governments to develop REP.

13.3.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 13.3 of the certified ESBWR DCD. The staff reviewed Section 13.3 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirms that the information contained in the application and the information incorporated by reference address the relevant information related to this section.

The staff reviewed the information in the Fermi 3 COL FSAR:

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

COL Items

- STD COL 13.3-1-A — Identification of OSC and Communication Interfaces with Control Room and TSC
- STD COL 13.3-2-A — Identification of EOF and Communication Interfaces with Control Room and TSC
- STD COL 13.3-3-A — Decontamination Facilities

The staff's review of STD COL13.3-1-A, 13.3-2-A, and 13.3-3-A are in Attachment 13.3A of this SER. Additional detailed evaluations of STD COL 13.3-1-A and 13.3-2-A can be found in Attachment 13.3C, "Onsite Emergency Plan," Section 13.3C.8, and the evaluations of STD COL 13.3-3-A are in Section 13.3C.11 of this SER.

Supplemental Information

The staff's review of the information provided in the application that is not part of the Fermi 3 Emergency Plan is in Attachment 13.3B, "Emergency Planning Information in the Application," of the SER.

Onsite Emergency Plan

The staff's evaluation of the applicant's Emergency Plan is in Attachment 13.3C of this SER. The staff finds that the applicant's onsite emergency plan is acceptable because it meets the standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50. Verification that the proposed revisions to the Onsite Emergency Plan are incorporated into the next FSAR revision is being tracked as confirmatory items.

Offsite Emergency Plans

FEMA reviewed the offsite emergency plans for the State of Michigan Emergency Management Plan (December 2005), State of Michigan Department of Environmental Quality Nuclear Facilities Emergency Management Plan (February 2008), Monroe County Emergency Management Plan (March 2006), and the Wayne County Emergency Operations Plan (June 2007). FEMA's Interim Findings Report (IFR) dated May 6, 2009 (see ADAMS Accession No. ML092360251), concluded that offsite emergency plans are adequate and there is reasonable assurance that they can be implemented. The staff has reviewed the FEMA report and concurs with FEMA's findings and determination regarding offsite EP.

ITAAC

- STD SUP 14.3-1-A

The COL applicant shall provide EP-ITAAC based on industry guidance.

The staff's evaluation of the proposed site-specific EP-ITAAC against the generic EP-ITAAC in NUREG–0800, Section 14.3.10, Table 14.3.10-1, "Emergency Planning Generic Inspections, Tests, Analyses, and Acceptance Criteria (EP-ITAAC)," and 10 CFR 52.80(a), located in Section 13.3C.19 of this SER, finds that the applicant has adequately addressed the applicable EP-ITAAC needed to provide reasonable assurance that, upon successful completion, the

facility will be constructed and operated in conformity with the COL, the provisions of the Atomic Energy Act, and the Commission's rules and regulations. Verification that proposed revisions to the EP-ITAAC are incorporated into the next FSAR revision was being tracked as confirmatory items. The staff verified that Fermi 3 COL Part 10, Revision 4 included the proposed site-specific EP-ITAAC in Table 2.3-1. Therefore, this confirmatory item is resolved.

License Conditions

- Part 2, License Condition [COM 13.4-031]

The applicant proposed a license condition related to the plant-specific EALs. Specifically, the applicant proposed the following:

> The applicant proposed a license condition [COM 13.4-031] to submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07-01, Revision 0, with no deviations. The fully developed site-specific EAL scheme shall be submitted to the NRC for confirmation at least 180 days prior to initial fuel load.

The staff revised the proposed license condition as follows:

> The licensee shall submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07-01, Revision 0, with no deviations. The EAL scheme shall have been discussed and agreed upon with State and local officials. The fully developed site-specific EAL scheme shall be submitted to the NRC at least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a).

With this modification, the staff finds this license condition acceptable. The staff's evaluation of the EALs is documented in Section 13.3C.4 of the SER.

- Part 10, License Condition

The applicant provided a license condition in Section 2.3 of Part 10, "Emergency Planning ITAAC," Table 2.3-1, "ITAAC For Emergency Planning," of the Fermi 3 COL application. This table adequately addresses requirements of 10 CFR 52.80(a) for site-specific EP-ITAAC in a COL application and is therefore acceptable. The staff's detailed evaluation of the EP-ITAAC identified in Table 2.3-1 of Part 10 of the Fermi 3 COL application is documented in Attachment 13.3C Section 13.3C.19 of this SER.

- Part 10, License Condition

The applicant has proposed a license condition to execute formal Letters of Agreement with State and local agencies with Emergency Plan responsibilities prior to fuel load. Specifically, the applicant proposed the following:

> Prior to loading fuel, Detroit Edison shall execute formal Letters of Agreement with the following entities:

1. Michigan State Police
2. Monroe County Emergency Management Division
3. Wayne County Department of Homeland Security & Emergency Management
4. Frenchtown Charter Township Fire Department
5. Mercy Memorial Hospital Corporation
6. Monroe Community Ambulance
7. Oakwood Southshore Medical Center
8. Ohio Emergency Management Agency
9. Monroe County Community College

These Letters of Agreement will identify the specific nature of arrangements in support of emergency preparedness for operation of the proposed new nuclear unit. The Emergency Plan shall be revised to include these Letters of Agreement after they have been executed.

The staff's evaluation of the LOA is documented in Attachment 13.3C, Section 13.3C.1.7, "Written Agreements," of this SER.

- Part 10, License Condition

The applicant proposed a license condition to submit a detailed analysis of on-shift staffing, in accordance with NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," Revision 0, and the licensee shall incorporate any changes to the Emergency Plan needed to bring staff to the required levels, prior to or concurrent with completion of Emergency Plan ITAAC 2.0 of Emergency Plan ITAAC Table 2.3.1, and no less than 180 days prior to initial fuel load.

The staff finds that the proposed DTE license condition adequately addresses the required detailed analysis of on-shift staffing. This is acceptable because it conforms to the guidance in the Nuclear Security and Incident Response/Division of Preparedness and Response-Interim Staff Guidance (NSIR/DPR-ISG)-01, "Interim Staff Guidance on Emergency Planning for Nuclear Power Plants." Verification that a future revision of the COL application incorporates a license condition concerning on-shift staffing, in accordance with NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," is being tracked as Confirmatory Item 13.03 77. The staff verified that Fermi 3 COL Part 10, Revision 6 included the proposed license condition. Therefore, Confirmatory Item 13.03 77 is resolved. The staff revised the applicants proposed license condition to align the timing of the completion of the license condition with regulatory requirements associated with ITAAC schedules.

The staff revised the proposed license condition as follows:

The licensee shall conduct a detailed analysis of on-shift staffing, in accordance with the NRC endorsed version of NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," Revision 0, and the licensee shall incorporate any changes to the Emergency Plan needed to bring staffing to the required levels, prior to or concurrent with completion of Emergency Plan ITAAC 2.0 of Emergency Plan ITAAC Table 2.3.1.

With this modification, the staff finds this license condition acceptable. The staff's evaluation of the license condition to perform the required detailed analysis of on-shift staffing is documented in Section 13.3C.2.7 of the SER.

13.3.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the staff finds the following ITAAC and license conditions acceptable:

- The licensee shall perform and satisfy the ITAAC defined in Table 2.3-1 of COL application Part 10.

    - License Condition (13.3-1) The licensee shall submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07-01, Revision 0, with no deviations. The EAL scheme shall have been discussed and agreed upon with State and local officials. The fully developed site-specific EAL scheme shall be submitted to the NRC at least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a).

- License Condition (13.3-2) License Condition COL application Part 10 – The applicant shall execute formal Letters of Agreement with State and local agencies with Emergency Plan responsibilities prior to fuel load. These Letters of Agreement will identify the specific nature of arrangements in support of emergency preparedness for operation of the proposed new nuclear unit. The Emergency Plan shall be revised to include these Letters of Agreement after they have been executed.

- License Condition (13.3-3) The licensee shall conduct a detailed analysis of on-shift staffing, in accordance with the NRC endorsed version of NEI 10-05, “Assessment of On-Shift Emergency Response Organization Staffing and Capabilities,” Revision 0, and the licensee shall incorporate any changes to the Emergency Plan needed to bring staffing to the required levels, prior to or concurrent with completion of Emergency Plan ITAAC 2.0 of Emergency Plan ITAAC Table 2.3.1.

13.3.6 Conclusion

The NRC staff’s finding related to information incorporated by reference is in NUREG–1966. The NRC staff reviewed the application and checked the referenced DCD. The staff’s review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

In addition, the staff compared the additional COL supplemental information in the application to the relevant NRC regulations, the guidance in Section 13.3 of NUREG-0800, and other NRC RGs. The staff concludes that the Fermi 3 Emergency Plan provides an adequate expression of the overall concept of the operation and describes the essential elements of advanced planning and the provisions adopted to cope with emergency situations. The staff’s detailed evaluations of the Fermi 3 Emergency Response Plan are located in Attachments 13.3A, 13.3B, and 13.3C of this SER.

Based on FEMA’s IFR and its evaluation of the Fermi 3 Emergency Response Plan, the staff concludes there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. Therefore, the staff concludes that the Fermi 3

Emergency Response Plan meets the requirements of 10 CFR 50.33(g), 10 CFR 50.34(b)(6)(v), 10 CFR 50.34(f)(2), 10 CFR 50.47, Appendix E to 10 CFR Part 50, 10 CFR 52.77, 10 CFR 52.79(a)(21), 10 CFR 52.79(a)(22)(i), 10 CFR 52.80, 10 CFR 52.81, and 10 CFR 52.83.

Pursuant to 10 CFR 50.47(a) and subject to the license conditions noted above and the satisfactory completion of the EP-ITAAC, the staff concludes there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the Fermi 3 site. The staff also finds that emergency preparedness for Fermi 3 is adequate to support full-power operations.

Attachment 13.3A COL Information Items, Supplemental Information Items, and Departures

This attachment addresses the COL information items and the supplemental information items and departures associated with EP.

13.3A.1 Regulatory Basis

The regulatory basis for accepting the resolution of COL Item STD COL 13.3-1-A requiring the identification of OSC and communication interfaces with the control room (CR) and TSC is established in 10 CFR 50.47(b), 10 CFR 50.34(f)(2)(xxv), and the guidance in NUREG-0654/FEMA-REP-1, Revision 1, (including the March 2002 addenda) and NUREG-0696, “Functional Criteria for Emergency Response Facilities.”

The regulatory basis for accepting the resolution of the COL Item STD COL 13.3-2-A requiring the identification of the EOF and communication interfaces with the CR and TSC is established in 10 CFR 50.47(b), 10 CFR Part 52, Appendix E to 10 CFR Part 50, 10 CFR 50.33(g), 10 CFR 52.79(a)(17), and 10 CFR 50.34(f)(2)(xxv); and the guidance in NUREG-0654/FEMA-REP-1, Revision 1 (including the March 2002 addenda), and NUREG-0696.

The regulatory basis for accepting the resolution of COL Item STD COL 13.3-3-A, “Decontamination Facilities,” requiring supplies to be provided for the decontamination of onsite individuals is established in 10 CFR 50.47(b), 10 CFR Part 52 and Appendix E to 10 CFR Part 50.

The regulatory basis for accepting the resolution of COL Item STD COL 14.3-1-A, “EP-ITAAC,” is based on industry guidance and is in 10 CFR 52.80(a). This item requires a COL application to include the proposed ITAAC that the licensee shall perform—including those applicable to EP—and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that if the ITAAC are successfully completed, the facility will be constructed and operated to conform with the COL, the provisions of the Atomic Energy Act, the Commission's rules and regulations, and the guidance in Section 14.3.10 of NUREG-0800.

13.3A.2 COL Information Items

Technical Information in the Application:

- STD COL 13.3-1-A — Identification of OSC and Communication Interfaces with Control Room and TSC

Section 13.3 of the Fermi 3 COL FSAR replaces the fifth through the ninth paragraphs of the ESBWR DCD Tier 2 information with the following:

> As addressed in the emergency plan, the TSC is provided with reliable voice and data communication with the MCR and Emergency Operations Facility (EOF) and reliable voice communications with the Operational Support Center (OSC), NRC, and state and local operations centers.
>
> The OSC communications system has at least one dedicated telephone extension to the control room, and one dedicated telephone extension to the TSC, and one telephone capable of reaching on-site and off-site locations, as a minimum."

- STD COL 13.3-2-A — Identification of EOF and Communication Interfaces with Control Room and TSC

Section 13.3 of the Fermi 3 COL FSAR replaces the fifth through the ninth paragraphs of the ESBWR DCD Tier 2 with the same information described for COL Item STD COL 13.3-1-A listed above.

- STD COL 13.3-3-A — Decontamination Facilities

Section 13.3 of the Fermi 3 COL FSAR replaces the second sentence in the tenth paragraph of the ESBWR DCD Tier 2 with the following:

> Supplies are provided in the service building adjacent to the main change rooms for decontamination of on-site individuals.

Technical Evaluation:

- STD COL 13.3-1-A — Identification of OSC and Communication Interfaces with Control Room and TSC

The staff's review of the information in the application that addresses COL Item STD COL13.3-1-A concludes that it meets the requirements in 10 CFR 50.47(b) and 10 CFR 50.34(f)(2)(xxv) and the guidance in Revision 1 to NUREG-0654/FEMA-REP-1 (including the March 2002 addenda) and NUREG-0696. The details of this review are in Section 13.3C.8 of this SER.

- STD COL 13.3-2-A — Identification of EOF and Communication Interfaces with Control Room and TSC

The staff's review of the applicant's information that addresses COL Item STD COL 13.3-2-A concludes that it meets the requirements in 10 CFR 50.47(b), 10 CFR Part 52, Appendix E to 10 CFR Part 50, 10 CFR 50.33(g), 10 CFR 52.79(a)(17), and 10 CFR 50.34(f)(2)(xxv) and the

guidance in Revision 1 to NUREG-0654/FEMA-REP-1 (including the March 2002 addenda) and NUREG-0696. The details of this review are in Section 13.3C.8 of this SER.

- STD COL 13.3-3-A Decontamination Facilities

The staff's review of the applicant's information that addresses COL Item STD COL 13.3-3-A concludes that it meets the requirements in 10 CFR 50.47(b), 10 CFR Part 52, and Appendix E to 10 CFR Part 50. The details of this review are in Section 13.3C.11 of this SER.

13.3A.3 Supplemental Information Items

- STD COL 14.3-1-A Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)

Section 14.3 "Inspections, Tests, Analysis, and Acceptance Criteria" describes replacing the last paragraph of this section in the ESBWR DCD Tier 2 with the following:

> The requirements for inclusion of Emergency Planning ITAAC (EP-ITAAC) in a COLA are provided in 10 CFR 52.80(a). In SRM-SECY-05-0197, the NRC approved generic EP-ITAAC for use in COL and ESP applications. This set of EP-ITAAC was considered in the development of the plant-specific EP-ITAAC, which are tailored to the ESBWR design. The plant-specific EP-ITAAC are included in a separate part of the COLA.

Technical Evaluation:

- STD COL 14.3-1-A Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)

The COL applicant states that the NRC-approved generic EP-ITAAC for use in COL applications was considered in the development of the Fermi 3 plant-specific EP-ITAAC. The plant-specific EP-ITAAC are included in the Fermi 3 COL application Part 10. The resolution of this COL item is addressed in Section 13.3C.19 of this SER.

13.3A.4 Departures

There are no departures that affect emergency preparedness.

13.3A.5 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. The NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

In addition, NRC staff compared the COL items and the supplemental information item in the Fermi 3 COL application to the applicable NRC regulations and other NRC RGs. Therefore the staff concludes that the applicant has provided sufficient information to comply with the applicable regulatory requirements in 10 CFR 50.33(g), 10 CFR 52.79(a)(17),

10 CFR 52.79(a)(21), 10 CFR 50.34(f)(2)(xxv), 10 CFR 50.47(b); and the applicable guidance in NUREG-0654/FEMA-REP-1, NUREG-0696, and NUREG-0800.

Attachment 13.3B Emergency Planning Information in the Application

This attachment of the SER includes the NRC staff's evaluation of Emergency Plan information that the applicant is required to provide in the COL application. However, the attachment does not address the applicant's plans for responding to a radiological emergency, which are evaluated in Attachment 13.3C of this SER.

13.3B.1 Regulatory Basis[2]

The applicable regulatory requirements for Emergency Plan information are as follows:

- Appendix E to 10 CFR Part 50, Section I, "Introduction," describes the emergency planning zone (EPZ.)

- Appendix E to 10 CFR Part 50, Section E.III, "The Final Safety Analysis Report," requires the FSAR to include plans for coping with emergencies.

- 10 CFR 52.79(a)(21) and 10 CFR 50.34(b)(6)(v), "Contents of applications; technical information," also require the FSAR to include an onsite emergency plan that meets the requirements in 10 CFR 50.47 and Appendix E to 10 CFR Part 50.

- 10 CFR 50.33, "Content of the application; general information," and 10 CFR 52.77, "Contents of applications; general information," require in part, the submittal of State and local emergency plans.

- 10 CFR 50.33(g) requires in part, a description of the plume exposure pathway and the ingestion pathway EPZs. In addition, 10 CFR 50.47(c)(2), "Emergency plans," states generally that the plume exposure pathway EPZ for nuclear power plants shall consist of an area about 16 kilometers [km] (10 miles [mi]) in radius and the ingestion pathway EPZ shall consist of an area about 80 km (50 mi) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to local emergency response needs and capabilities as they are affected by conditions such as demography, topography, land characteristics, access routes, and jurisdictional boundaries. The plans for the ingestion pathway shall focus on actions that are appropriate to protect the food ingestion pathway.

- 10 CFR 50.34(b)(6)(v) requires plans for coping with emergencies that shall include the items specified in Appendix E. 10 CFR 50.34(h)(1)(i) and 10 CFR 52.79(a)(41) require the COL application to include an evaluation of the facility against NUREG-0800. Section 13.3 of NUREG-0800 provides guidance for reviewing onsite emergency plans for nuclear power plants. 10 CFR 50.34(h)(2) and (3) require the evaluation to identify and describe all differences from the NUREG-0800 acceptance criteria in Section 13.3 and to evaluate how the proposed alternatives to the NUREG-0800 criteria provide an

[2] The bracketed [ ] alphanumeric designations used throughout this SER section identify the corresponding NUREG-0654/FEMA-REP-1 evaluation criteria used by the staff to determine compliance with 10 CFR 50.47(b).
Braces { } identify requirements in Appendix E to 10 CFR Part 50.
Parentheses ( ) identify other applicable regulatory requirements.

acceptable method for complying with the Commission regulations. Where differences exist, the evaluation should discuss how the proposed alternative provides an acceptable method for complying with the Commission regulations or portions thereof that underlie the corresponding NUREG-0800 acceptance criteria.

- 10 CFR 52.73, "Relationship to other subparts," states that the application for a COL may reference a standard design.

- 10 CFR 52.79(a)(22)(i) requires certifications from State and local governmental agencies with Emergency Plan responsibilities stating that (1) the proposed emergency plans are practicable; (2) these agencies are committed to participating in any further development of the plans, including any required field demonstrations; and (3) these agencies are committed to executing their responsibilities under the plans in the event of an emergency.

- 10 CFR 52.81, "Standards for review of applications," states that COL applications will be reviewed according to the standards in 10 CFR Part 50 and Part 100, "Reactor Site Criteria." Therefore, the requirements of 10 CFR Part 100, Subpart B, "Evaluation Factors for Stationary Power Reactor Site Applications on or After January 10, 1997," are applicable. 10 CFR 100.1(c), "Reactor Site Criteria, Purpose," requires the identification of physical characteristics unique to the proposed site that could pose a significant impediment to the development of emergency plans. In addition, 10 CFR 100.21(g) also requires applications for site approval to identify physical characteristics unique to the proposed site.

- 10 CFR 100.1(c) states that siting factors and criteria are important in assuring that radiological doses from normal operation and postulated accidents will be acceptably low, that natural phenomena and potential man-made hazards will be appropriately accounted for in the design of the plant, that site characteristics are such that adequate security measures to protect the plant can be developed, and that physical characteristics unique to the proposed site that could pose a significant impediment to the development of emergency plans are identified.

- 10 CFR 100.21(g) states that physical characteristics unique to the proposed site that could pose a significant impediment to the development of emergency plans must be identified.

- 10 CFR 30.32(i)(1) contains the requirements regarding the emergency plan implementation prior to possessing radioactive materials in an unsealed form on foils or plated sources or sealed in glass in excess of the quantities in 10 CFR 30.72, "Schedule C--Quantities of radioactive materials requiring consideration of the need for an emergency plan for responding to a release."

- 10 CFR 40.31 (j)(1) contains the requirements regarding the emergency plan implementation prior to possessing uranium hexafluoride in excess of 50 kilograms in a single container or 1,000 kilograms total.

- 10 CFR 70.22 (i)(1) contains the requirements regarding the emergency plan implementation prior to possessing enriched uranium or plutonium, which in turn requires a criticality accident alarm system for uranium hexafluoride in excess of 50

kilograms in a single container or 1,000 kilograms total; or in excess of 2 curies of plutonium in an unsealed form or on foils or plated sources.

13.3B.2 FSAR and Onsite Emergency Plan

Technical Information in the Application: {Appendix E, Section III} (10 CFR 52.79(a)(21)) (10 CFR 50.34(b)(6)(v)) Section 13.3 of the COL FSAR states that the emergency plan should be prepared in accordance with 10 CFR 52.79(d) and maintained as a separate document. The document is Part 5, "Emergency Plan," (Fermi 3 Emergency Plan) of the COL application. In Part 5, Section I.B, "Scope," states that the plan should describe actions to be taken in the event of a radiological emergency at Fermi 3 that may impact the health and safety of the general public or plant employees. In Section I.C, "Planning Basis," the Fermi Emergency Plan states that it meets the planning standards set forth in 10 CFR 50.47(b) and the requirements of 10 CFR Part 50, Appendix E. The Plan was developed to address the applicable provisions of RG 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors," and is also based on the guidance in Revision 1 to NUREG-0654/FEMA-REP-1. The Fermi Emergency Plan also includes seven appendices that provide additional detailed information on various aspects of the onsite emergency plan.

Technical Evaluation: {Appendix E, Section III} (10 CFR 52.79(a)(21)) (10 CFR 50.34(b)(6)(v)) The staff's review finds that the Fermi 3 COL FSAR includes an emergency plan for coping with emergencies at the Fermi 3 site that meets the applicable requirements in Section III of Appendix E to 10 CFR Part 50, 10 CFR 52.79(a)(21), and 10 CFR 50.34(b)(6)(v).

13.3B.3 Submittal of State and Local Emergency Plans

Technical Information in the Application: (10 CFR 50.33) The "Explanatory Notes Regarding the Emergency Plan and Supplemental Information" of the Fermi 3 Emergency Plan states that current State and local Emergency Plan documents are included as Supplemental Information. The list of State and local Emergency Plan documents includes:

- Michigan Emergency Management Plan
- Monroe County Management Plan
- Wayne County Operations Plan
- Michigan Department of Environmental Quality Nuclear Facilities Emergency Management Plan
- The Ohio Plan for Response to Radiation Emergencies at Commercial Nuclear Power Plants

The applicant has submitted all required offsite Emergency Plans for State and local governmental entities that are wholly or partially within the plume exposure pathway EPZ. These State and local governmental entities include the Michigan Counties of Monroe and Wayne. The offsite Emergency Plans for Michigan and Ohio, which are wholly or partially within the ingestion pathway EPZ, were required to be submitted. However, the State of Ohio plan was not included in the application. In RAI 13.03-35, the staff requested the applicant to provide

the Ohio State REP and letter of certification consistent with 10 CFR 50.33(g). In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant provided the ingestion pathway portion of the State of Ohio Emergency Operations Plan and the certification letter from the State of Ohio. The applicant's response also included a proposed revision of Appendix 2 to the Fermi 3 Emergency Plan that includes the State of Ohio Certification Letter in the list of certification letters.

Technical Evaluation: (10 CFR 50.33) The staff finds the applicant's response to RAI 13.03-35 acceptable because it included both the Ohio State Emergency Response Plan and the requested letter of certification. The applicant submitted all required offsite emergency plans for State and local governmental entities that are wholly or partially within the plume exposure pathway EPZ. These submittals are acceptable because they meet the requirements in 10 CFR 50.33(g).

13.3B.4 Description of the Emergency Planning Zones

Technical Information in the Application: {Appendix E, Section I} (10 CFR 50.33(g)) (10 CFR 50.47(c)(2)) Section I.D, "Emergency Planning Zones," of the Emergency Plan describes both the plume and ingestion exposure pathway EPZs. The plume exposure pathway EPZ is described as an area approximately 16 km (10 mi) in radius around the site. Figure I-1, "Fermi 3 Plume Exposure Pathway EPZ," of the Emergency Plan illustrates the EPZ.

The ingestion pathway EPZ is described as an area approximately 80 km (50 mi) in radius around the site. Figure I-2, "Fermi 3 Ingestion Exposure Pathway EPZ," of the Emergency Plan illustrates the EPZ.

Technical Evaluation: FEMA and the staff reviewed the applicant's description of the EPZ and finds the size acceptable because it meets the requirements of 10 CFR 50.33(g), 10 CFR 50.47(c)(2), and Section 1 of Appendix E to 10 CFR Part 50.

13.3B.5 Certifications from State and Local Governments

Technical Information in the Application: (10 CFR 52.79(a)(22)(i)) Appendix 2, "Certification Letters," to the Fermi Emergency Plan includes a list of certification letters from the Michigan State Police, the Monroe County Emergency Management Division, the Wayne County Department of Homeland Security & Emergency Management, and the Frenchtown Charter Township Fire Department. In RAI 13.03-01-05, the staff requested the applicant to provide Certification Letters for the Appendix 2 list of organizations that may be required to provide support to Fermi 3 in the event of an emergency. The applicant's response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), proposed a license condition to execute formal Letters of Agreement (LOAs) with each agency listed in Appendix 2 of the Fermi 3 Emergency Plan, prior to loading fuel. The LOAs will identify the specific nature of the arrangements supporting the Fermi 3 Emergency Plan.

Technical Evaluation: The staff finds the applicant's response to RAI 13.03-01-05 acceptable because it meets the requirements of 10 CFR 52.79(a)(22)(i). The staff confirmed that Revision 4 to Part 10 "ITAAC" of the Fermi 3 COL application incorporates the information and textual changes in the response to RAI 13.03-01-05. The staff finds that the revision to Section 3.1 ("Emergency Planning Actions") of Part 10 to the Fermi 3 COL application provides

an adequate license condition to ensure that the requirements of 10 CFR 52.79(a)(22)(i) will be met prior to fuel load.

13.3B.6 Evaluation Against the Standard Review Plan

Technical Information in the Application: (10 CFR 52.79(a)(41)) (10 CFR 50.34(h)(1)(i)) (10 CFR 50.34(h)(2 and 3)) In Section 1.9 “Conformance with Standard Review Plan and Applicability of Codes and Standards,” of Part 2 in the Fermi 3 COL application, the applicant provided Table 1.9-201, “Conformance with Standard Review Plan,” to document that the application conforms to the SRP acceptance criteria. Table 1.9-201 indicates that Section 13.3, "Emergency Planning," conforms to the SRP acceptance criteria and is therefore acceptable.

The applicant uses the term “conforms” in Table 1.9-201 to mean that no exception is taken to the SRP acceptance criteria as they apply to site-specific design information, operational aspects of the facility, or siting information in the FSAR. Also, the term “Not applicable” means that the SRP acceptance criteria do not apply to the ESBWR or to Fermi 3. Any differences with the SRP acceptance criteria are identified and justified, with references to the applicable FSAR sections that address the difference.

Technical Evaluation: The staff reviewed the applicant’s evaluation of the Fermi Emergency Plan against the applicable portions of SRP Section 13.3, “Emergency Planning,” dated March 2007 and identified the differences between the SRP acceptance criteria in Section 13.3 and application Table 1.9-201 to be adequately described. Therefore, the staff’s review finds that the information is acceptable and meets the requirements of 10 CFR 52.79(a)(41), 10 CFR 50.34(h)(1)(i), and 10 CFR 50.34(h)(2 and 3).

13.3B.7 Reference to a Standard Design

Technical Information in the Application: Section 13.3, of the COL FSAR states that Section 13.3 of the ESBWR DCD is incorporated by reference with departures and/or supplements as noted.

Technical Evaluation: The staff’s review finds that the ESBWR DCD is incorporated by reference into the Fermi 3 COL FSAR and the evaluation of the departures and supplements is in Attachment 13.3A of this SER. This information is acceptable because it meets the requirements of 10 CFR 52.73.

13.3B.8 Impediments to the Development of Emergency Plans

Technical Information in the Application: (10 CFR 52.81) (10 CFR 100.1(c)) (10 CFR 100.21(g)) Appendix 5 to the Emergency Plan, “Evacuation Time Estimate Summary,” states that the ETE report, “Fermi Nuclear Plant Development of Evacuation Time Estimates,” dated August 2010 describes the analyses undertaken and the results obtained by the study. On the basis of the information in the ETE Report, Appendix 5 of the Fermi 3 Emergency Plan, the staff concludes that there are no unique physical characteristics on the NPP site that pose a significant impediment to the development of emergency plans.

Technical Evaluation: (10 CFR 52.81) (10 CFR 100.1(c)) (10 CFR 100.21(g)) The applicant has demonstrated through the ETE Report that no physical characteristics unique to the proposed site would pose a significant impediment to the development of emergency plans.

Therefore, the staff finds that the information is acceptable because it meets the requirements of 10 CFR 100.1(c), 10 CFR 100.21(g), and 10 CFR 52.81. The staff's review of the ETE Report is in Section 13.3C.18, "Evacuation Time Estimates Analysis," of this SER.

13.3B.9 Emergency Planning for Byproduct, Source, and Special Nuclear Material Licenses

Technical Information in the Application: (10 CFR 30.32(i), 10 CFR 40.31(j), and 10 CFR 70.22(i)(1)) In Table 13.4-201, "Operational Programs Required by NRC Regulations," of Section 13.4, "Operational Program Implementation," of the Fermi 3 FSAR, the applicant requests applicable licenses under 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"; Part 40, "Domestic Licensing of Source Material"; and Part 70, "Domestic Licensing of Special Nuclear Material," prior to the initial receipt of by-product sources or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18). In RAI 13.03-88 the staff requested additional information regarding the requirements of 10 CFR 30.32(i)(1). Specifically, the staff asked whether the request for a Part 30 license involves authorization to receive or possess by-product material(s) "in unsealed form, on foils, plated sources, or sealed in glass," in excess of the quantities in 10 CFR 30.72, Schedule C. The applicant's response to RAI 13.03-88 dated December 6, 2013 (ADAMS Accession No. ML13344B028), states that no by-product material in an unsealed form, on foils or plated sources, or sealed in glass in excess of the quantities in Schedule C of 10 CFR 30.72 would be received, possessed, or used at the Fermi 3 site. Because the quantities do not exceed Schedule C, an Emergency Plan that meets the requirements of 10 CFR 30.32(i)(3) is not required. As such, the implementation of the Emergency Plan prior to the receipt of by-product material will be removed from FSAR Table 13.4-201, "Operational Programs Required by NRC Regulations." In RAI 13.03-89, the staff requested additional information regarding the requirements of 10 CFR 40.31(j)(1). Specifically, whether the request for a Part 40 license involves authorization to receive, possess, or use uranium hexafluoride in excess of 50 kilograms (kg) (110 pounds [lb]) in a single container or 1,000 kg (about 2,200 lb) total. The applicant's response to RAI 13.03-89 dated December 6, 2013 (ADAMS Accession No. ML13344B028), states that the Part 40 license would not involve authorization to receive, possess, or use uranium hexafluoride in excess of 50 kg (110 lb) in a single container or 1,000 kg (2,200 lb) total. Because the quantities would not exceed the values listed above, an Emergency Plan for responding to the radiological hazards of an accidental release of source material and to any associated chemical hazards related to the material is not required. As such, the implementation of the Emergency Plan prior to the receipt of source material will be removed from FSAR Table 13.4-201, "Operational Programs Required by NRC Regulations." And Chapter 12 of the FSAR will be revised to include a requirement addressing these limitations during the period before the implementation of the Emergency Plan (before the initial fuel loading and following the finding that the acceptance criteria in the COL has been met as stated in 10 CFR 52.103(g)). In RAI 13.03-90, the staff requested additional information regarding the requirements of 10 CFR 70.22(i)(1) and whether the request for a Part 70 license involves authorization to possess enriched uranium for which a criticality accident alarm system is required. The applicant's response to RAI 13.03-90 dated December 6, 2013 (ADAMS Accession No. ML13344B028), states that the request for a Part 70 license does not involve authorization to possess enriched uranium for which a criticality accident alarm system is required, uranium hexafluoride in excess of 50 kg (110 lb) in a single container or 1,000 kg (2,200 lb) total, or in excess of 2 curies of plutonium in an unsealed form or on foils or plated sources. Hence, an emergency plan that meets 10 CFR 70.22(i)(3) is not required. Therefore, the implementation of the Emergency Plan before the receipt of special nuclear materials will be

removed from FSAR Table 13.4-201, “Operational Programs Required by NRC Regulations.” Also, Chapter 12 of the FSAR will be revised to include a requirement addressing these limitations during the period prior to the implementation of the Emergency Plan (prior to the initial fuel loading and following the finding that the acceptance criteria in the COL has been met as required in 10 CFR 52.103(g)).

Technical Evaluation: (10 CFR 30.32(i), 10 CFR 40.31(j), and 10 CFR 70.22(i)(1)) The staff finds that the additional information and textual revisions to the Fermi 3 FSAR that the applicant submitted in response to RAIs 13.03-88, 13.03-89, and 13.03-90 acceptable because they meet the requirements of 10 CFR 30.32(i), 10 CFR 40.31(j), and 10 CFR 70.22(i)(1). The staff confirmed that Revision 7 of the Fermi 3 FSAR incorporated the proposed revisions to (1) remove a reference to implement the Emergency Plan prior to initial receipt of by-product sources or special nuclear materials from FSAR Table 13.4-201; and (2) include information to address the requirements of 10 CFR 30.32(i), 10 CFR 40.31(j), and 10 CFR 70.22(i)(1) during the period prior to implementing the Emergency Plan to Subsection 12.2.1.5 of Chapter 12 of the Fermi 3 FSAR as described in the responses to RAIs 13.03-88, 13.03-89, and 13.03-90.

The staff created Confirmatory Items 13.03-73 through 13.03-75 to track the proposed revisions to (1) remove a reference to implement the Emergency Plan prior to initial receipt of by-product sources or special nuclear materials from FSAR Table 13.4-201; and (2) include information to address the requirements of 10 CFR 30.32(i), 10 CFR 40.31(j), and 10 CFR 70.22(i)(1) during the period prior to implementing the Emergency Plan to Subsection 12.2.1.5 of Chapter 12 of the Fermi 3 FSAR. The staff finds that the information provided is acceptable and meets the requirements of 10 CFR 30.32(i), 10 CFR 40.31(j), and 10 CFR 70.22(i)(1).

The staff created Confirmatory Item 13.03-73 to track the revision to remove the reference to 10 CFR 30.32(i)(3) in FSAR Table 13.4-201. This item also tracks a revision to Chapter 12 of the FSAR to include a requirement for addressing the limitations of 10 CFR 30.32(i)(3) during the period prior to the implementation of the Emergency Plan, prior to the initial fuel loading, following the finding that the acceptance criteria in the COL has been met as required in 10 CFR 52.103(g). The staff verified that FSAR Revision 7 includes the references in FSAR Table 13.4-201. Therefore, Confirmatory Item 13.03-73 is resolved.

The staff created Confirmatory Item 13.03-74 to track the revision to remove the reference to 10 CFR 40.31(j)(1) in FSAR Table 13.4-201 and a revision to Chapter 12 of the FSAR to include a requirement for addressing the limitations of 10 CFR 40.31(j)(1) during the period prior to the implementation of the Emergency Plan,(prior to the initial fuel loading, following the finding that the acceptance criteria in the COL has been met as required in 10 CFR 52.103(g)). The staff verified that FSAR Revision 7 includes the references in FSAR Table 13.4-201. Therefore, Confirmatory Item 13.03-74 is resolved.

The staff created Confirmatory Item 13.03-75 to track the revision to remove the reference to 10 CFR 70.22(i)(1) in FSAR Table 13.4-201 and a revision to Chapter 12 of the FSAR to include a requirement for addressing the limitations of 10 CFR 70.22(i)(1) during the period prior to the implementation of the Emergency Plan, (prior to the initial fuel loading and following the finding that the acceptance criteria in the COL has been met as required in 10 CFR 52.103(g)). The staff verified that FSAR Revision 7 includes the references in FSAR Table 13.4-201. Therefore, Confirmatory Item 13.03-75 is resolved.

13.3B.10 Post Combined License Activities

The following License Condition is proposed by the applicant:

> Prior to loading fuel, Detroit Edison shall execute formal LOAs with the following entities:
>
> 1. Michigan State Police
> 2. Monroe County Emergency Management Division
> 3. Wayne County Department of Homeland Security & Emergency Management
> 4. Frenchtown Charter Township Fire Department
> 5. Mercy Memorial Hospital Corporation
> 6. Monroe Community Ambulance
> 7. Oakwood Southshore Medical Center
> 8. Ohio Emergency Management Agency
> 9. Monroe County Community College

These LOAs will identify the specific nature of arrangements in support of emergency preparedness for operating the proposed new nuclear unit. The Emergency Plan shall be revised to include these LOAs after they have been executed.

13.3B.11 Conclusion

NRC staff reviewed the Emergency Plan information required by regulations to be included in the application but not required to be part of the Fermi 3 Emergency Plan. The staff concludes that the information is acceptable and meets the requirements and guidance in 10 CFR 50.33, 10 CFR 50.34(b)(6)(v), 10 CFR 50.47(c)(2), 10 CFR 52.73, 10 CFR 52.77, 10 CFR 52.79, 10 CFR 52.81, 10 CFR 100.1(c), 10 CFR 100.21(g), and the applicable portions of Appendix E to 10 CFR Part 50 as discussed above.

Attachment 13.3C Onsite Emergency Plan

The NRC evaluates emergency plans for nuclear power reactors to determine that the plans are adequate and there is reasonable assurance that the plan can be implemented. This attachment to the SER provides the results of the onsite emergency plan review for the proposed new Fermi 3 Nuclear Power Plant site.

The Fermi 3 FSAR Section 13.3 states that the Fermi 3 Emergency Plan is included in Part 5 of the COL application. Also included as part of the onsite emergency plan are seven appendices, which provide additional detailed information on various aspects of the Fermi 3 Emergency Plan. In addition, Part 10 of the COL application includes a set of ITAAC related to the Fermi 3 Emergency Plan.

The following section describes the NRC staff's evaluation of the onsite Emergency Plan for the Fermi 3 site and parallels the planning standards in NUREG-0654/FEMA-REP-1, Revision 1. Compliance with the guidance in NUREG-0654/FEMA-REP-1, Revision 1, for each planning standard meets the requirements of 10 CFR 50.47(b).

By a letter dated December 18, 2012 (ADAMS Accession No. ML12355A032), the applicant provided additional information concerning the incorporation of the "Enhancements to Emergency Preparedness Regulations" (76FR72560) rule change to 10 CFR 50.47, 50.54(q);

10 CFR Part 50, Appendix E; and 10 CFR 52.79. The staff's evaluation of the additional information in this letter is discussed below.

13.3C.1 Assignment of Responsibility (Organizational Control)

13.3C.1.1 *Regulatory Basis*

In determining whether the proposed Fermi 3 Emergency Plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(1), the staff evaluated the plan against the detailed evaluation criteria[1] in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed Emergency Plan against applicable regulatory requirements related to the area of "Assignment of Responsibility (Organization Control)," in Appendix E to 10 CFR Part 50.[2]

13.3C.1.2 *Overall Response Organization*

Technical Information in the Emergency Plan: [A.1.a] Section II.A, "Assignment of Responsibility," describes the emergency response participating organizations and includes the concept of operations. Participating organizations and their descriptions include State agencies, county governments, local governments, and Federal emergency response agencies. State organizations identified in Section II.A.1.a.1, "State, Local and Provincial Governmental Agencies," include the Department of State Police and Department of Environmental Quality. Federal agencies identified in Section II.A.1.a.2, "Federal Agencies," include the NRC, the United States Department of Energy (DOE), FEMA, United States Coast Guard (USCG), and the United States Environmental Protection Agency (EPA).

In Section II.A.1.b, "Concept of Operations," the Michigan Department of Community Health (MDCH) is identified as a participating government agency with the overall responsibility to protect the health and safety of the general public from radiation. In RAI 13.03-01-02, the staff requested additional information regarding whether to include the MDCH in the listing of participating agencies in Section II.A.1.a.1. The applicant's response to RAI 13.03-01-02 dated December 7, 2009 (ADAMS Accession No. ML093440828), describes the responsibilities of the MDCH and described that the MDCH Bureau of Health Systems (Radiation Safety Section) is responsible for assisting the Michigan Department of Environmental Quality (MDEQ) staff in responding to nuclear accidents and emergency drills and exercises. The applicant states that the MDCH can provide health physics staff and expertise for radiological monitoring teams, worker decontamination centers, and the Joint Information Center (JIC). The applicant will revise Section II.A.1.b of the Fermi 3 Emergency Plan to explain that the MDCH shares the responsibility with MDEQ for coordinating medical support for a nuclear accident.

{Appendix E, Section IV.A.8} Section II.A.1.b identifies the State government agencies with emergency responsibilities and the Governor of the State of Michigan as having complete authority over offsite emergency operations and decision making. The Emergency Management Division, of the Michigan State Police is responsible for general planning, command and control, and overall direction and coordination. This responsibility includes

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[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

[2] The bracketed [ ] alphanumeric designations used throughout this SER section identify the corresponding NUREG–0654/FEMA-REP-1 evaluation criteria used by the staff to determine compliance with 10 CFR 50.47(b).
Braces { } identify requirements in Appendix E to 10 CFR Part 50.
Parentheses ( ) identify other applicable regulatory requirements.

coordinating the implementation of protective actions to evacuate and/or shelter the public. The MDEQ is responsible for advising State and local officials on the implementation of protective actions. Section II.A.1.b identifies the Chairperson of the Monroe County Board of Commissioners and the Wayne County Executive as the local government officials responsible for protective actions.

Technical Evaluation: [A.1.a] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-01-02 to be acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-01-02. The staff finds that the Fermi 3 Emergency Plan provides an adequate general discussion of the assignment of responsibilities and addresses protective actions. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

{Appendix E, Section IV.A.8} The staff finds that the Fermi 3 Emergency Plan adequately identifies State and/or local officials responsible for planning, ordering, and controlling appropriate protective actions including evacuations when necessary. This information is acceptable because it meets the requirements in Appendix E to 10 CFR Part 50.

13.3C.1.3 *Concept of the Operations*

Technical Information in the Emergency Plan: [A.1.b] Section II.A.1, "Emergency Organization," discusses the need to coordinate emergency response actions with Fermi 2 for events affecting both units and explains that a single Emergency Director is designated from the onsite shift management to carry out the Emergency Plan. Section II.A.1.b describes the applicant's responsibilities beginning with an assessment of plant conditions, the classification of emergencies, notifications, protective action recommendations (PAR), communications, and ending with a termination of emergency conditions. Section II.A.1.b identifies the Shift Manager as the responsible official for directing the activities of the plant staff in the initial assessment and in corrective and protective functions. The CR is the initial center for the coordination of emergency response actions. Once activated, the TSC provides supportive command and control functions of the CR. Following the activation of the emergency response facilities, a qualified senior manager assumes the Emergency Director position.

{Appendix E, Section III} FSAR Section 13.3.2, "Emergency Plan," states that the Emergency Plan is in Part 5 of the COL application. Section II.A of the Fermi 3 Emergency Plan describes the participating emergency response organizations and provides an overall concept of the operations. These include actions beginning with an assessment of plant conditions and ending with a termination of emergency conditions. The Plan describes the emergency response roles of supporting organizations and offsite agencies for State, local, and Federal agencies.

Technical Evaluation: [A.1.b] {Appendix E, Section III} The staff finds that the Fermi 3 Emergency Plan adequately describes the applicant's operational role, its concept of operations, and its relationship to the total effort. This information is acceptable because it conforms to the guidance in Revision 1 to NUREG-0654/FEMA-REP-1 and the requirements in Appendix E to 10 CFR Part 50.

13.3C.1.4 *Organizational Interrelationships*

Technical Information in the Emergency Plan: [A.1.c.] Figure II.A-1, "Emergency Operations Center Interrelationships," provides a block diagram of organizational interrelationships for the emergency operations center (EOC). Section II.A.1.b identifies the Monroe County EOC in Monroe, Michigan, and the Wayne County EOC in Romulus, Michigan. In RAI 13.03-01-04, the staff requested additional information on county EOCs. The applicant's response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), provided a revised Figure II.A-1 of the Fermi 3 Emergency Plan showing multiple county EOCs. Section II.A.1.a.1 identifies the Province of Ontario, Canada, as a participating organization, and the Ontario EOC is included in Figure II.A-1. Roles of the State Police; MDEQ, and MDCH are described in Section II.A.1.b.

Technical Evaluation: [A.1.c.] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-01-04 to be acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-01-04. The staff finds that the Fermi 3 Emergency Plan adequately illustrates the interrelationships among the participating organizations in an emergency response in a block diagram and in the text. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.1.5 *Individual in Charge of Emergency Response*

Technical Information in the Emergency Plan: [A.1.d] Section II.A.1.d, "Individual in Charge of Emergency Response," explains that the Shift Manager determines whether an emergency exists and the appropriate and applicable emergency classification. Upon the declaration of an emergency, the Shift Manager assumes the role of Emergency Director and is in charge of the emergency response.

Technical Evaluation: [A.1.d] The staff finds that the Fermi 3 Emergency Plan adequately identifies a specific individual by title who shall be in charge of the emergency response. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.1.6 *24-Hour Response Capability*

Technical Information in the Emergency Plan: [A.1.e.] Section II.A.1.e, "24 Hour Emergency Response Capability," explains that the applicant maintains the capability for a 24-hour response, which includes the manning of communications links. This capability is maintained through the training of multiple responders for key emergency response positions, the assignment of emergency response personnel to extended shifts when needed to support emergency response operations, the procurement of external resources to supplement the assigned staff, and the availability of basic necessities such as food and sleeping facilities to accommodate emergency response personnel.

Technical Evaluation: [A.1.e.] The staff finds that the Fermi 3 Emergency Plan adequately describes provisions for a 24-hour per day emergency response, including around-the-clock staffing of communication links. These provisions are acceptable because they conform to the guidance in NUREG-0654/FEMA-REP 1, Revision 1.

13.3C.1.7 *Written Agreements*

Technical Information in the Emergency Plan: [A.3] Section II.A.2, "Written Agreements," references Appendix 2 "Certification Letters," which documents a list of certification letters between the applicant and the State of Michigan, Monroe and Wayne County agencies, and private sector organizations. Appendix 2 states that agreements are also on file for the Michigan State Police, Monroe County Emergency Management Division, Wayne County Department of Homeland Security & Emergency Management, Frenchtown Charter Township Fire Department, Mercy Memorial Hospital Corporation, Monroe County Ambulance, and the Oakwood Southshore Medical Center. In RAI 13.03-01-05, the staff requested the applicant to revise the Emergency Plan to include copies of existing agreements with the organizations identified in Appendix 2. The applicant's response to RAI 13.03-01-05 dated December 7, 2009 (ADAMS Accession No. ML093440828), states that LOAs supporting the proposed Fermi 3 Emergency Plan have not yet been specifically executed. The applicant stated that these letters will be individually executed before operation as verified by the ITAAC for Emergency Plan in Table 2.3-1, Item 1.0, and the letters will be similar to those executed for the existing Fermi 2. In Supplemental RAI 13.03-07, the staff requested the applicant to provide in the copies of the Emergency Plan LOAs for Fermi 3. The applicant's response to Supplemental RAI 13.03-07 dated June 25, 2010 (ADAMS Accession No. ML101790463), further clarified that there are certification letters from the support agencies, and the LOAs will be executed prior to loading fuel at Fermi 3.

Technical Evaluation: [A.3] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan that the applicant submitted in response to RAI 13.03-01-05 and Supplemental RAI 13.03-07 acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 7 of the Fermi 3 FSAR contains a license condition stating that LOAs for Fermi 3 will be executed prior to operation. This response is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.1.8 *Operations for a Protracted Period*

Technical Information in the Emergency Plan: [A.4] Section II.A.3, "Continuous Operations," identifies either the Emergency Officer or the Emergency Director as the individual responsible for (1) ensuring a continuity of technical, administrative, and material resources during emergency operations; (2) procuring external resources as needed; and (3) establishing arrangements for basic necessities.

Technical Evaluation: [A.4] The staff finds that the Fermi 3 Emergency Plan adequately identifies the specific title of the individual responsible for the continuity of resources during a protracted period. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.1.9 *Conclusion*

The staff reviewed the onsite emergency plan as described above for the assignment of responsibility. The staff concludes that the information provided in the Fermi 3 Emergency Plan is acceptable and meets the requirements of 10 CFR 50.47(b)(1), because it complies with the guidance in Planning Standard A of NUREG-0654/FEMA-REP-1, Revision 1, and the applicable portions of Appendix E to 10 CFR Part 50 as described above.

13.3C.2 Onsite Emergency Organization

13.3C.2.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(2), the staff evaluated the plan against the detailed evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against applicable regulatory requirements related to the "Onsite Emergency Organization" in Appendix E to 10 CFR Part 50.

13.3C.2.2 *Normal Plant Operations Organization*

Technical Information in the Emergency Plan: {Appendix E, Section IV.A.1} Section II.B.1, "Onsite Emergency Organization," explains that the minimum staffing needed to conduct routine and emergency operations will be maintained under guidelines that are consistent with 10 CFR 50.54(m). This section also details the responsibilities of on-shift personnel. In addition, Table II.B-1 describes the minimum on-shift staffing requirements and augmented staffing according to functional areas, Emergency Response Facility (ERF), and emergency classification. Details of the normal plant organization are in plant administrative procedures. In RAI 13.03-02-01, the staff requested the title and description of the plant administrative procedures. The applicant's response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), states that details of the normal plant organization are in Section 13.1 of the Fermi 3 FSAR. The response also includes text for Section II.B.1 of the Fermi 3 Emergency Plan that references Section 13.1 of the FSAR. Plant administrative procedures describe the normal plan organization, including the reporting relationships. On-shift personnel are considered immediately available to respond to an emergency. In RAI 13.03-02-06, the staff requested the title of the Emergency Response Organization (ERO) Staffing Emergency Plan Implementing Procedure (EPIP) and a description of the controls required to allow lower level documents to contain the information in the emergency response plan (i.e., 10 CFR 50.54(q) commitment for the changes). The applicant's response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), includes a revision to Section II.B that details the ERO position, responsibilities, major tasks regarding ERO staffing required for initial emergency response actions, and provisions for the timely augmentation of on-shift personnel. The revision describes the following EPIPs:

1) Notifications/Communications
2) Technical Support Center Activation and Operation
3) Operational Support Center Activation and Operation
4) Emergency Operations Center Activation and Operation
5) Joint Information Center Activation and Operation

The applicant also provided a revision to Section II.P.6 stated that the changes to the EPIPs are in accordance with the requirements of 10 CFR 50.54(q).

Technical Evaluation: {Appendix E, Section IV.A.1} The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporates the information and textual changes in the responses to RAIs 13.03-02-01 and 13.03-06. The staff finds the additional information and revisions to the Fermi 3 Emergency Plan submitted in response to RAIs 13.03-02-01 and 13.03-06 acceptable, because the information conforms to the regulatory requirements of Appendix E to 10 CFR Part 50, Section IV.A.1 and the guidance in Revision 1 to NUREG-0654/FEMA-REP-1.

The staff finds that the Fermi 3 Emergency Plan adequately describes the normal plant organization and appropriately describes changes to the EPIPs in accordance with the requirements of 10 CFR 50.54(q).

13.3C.2.3 *Onsite Emergency Organization*

Technical Information in the Emergency Plan: [B.1] {Appendix E, Section IV.A.2.b} Section II.B.1 explains that the Shift Manager assumes responsibility as the Emergency Director upon declaration of an emergency and describes the assignment of plant staff for the emergency response. The full ERO is activated at the declaration of an Alert, Site Area Emergency, or General Emergency and includes the CR, OSC, TSC, and the EOF. Figure II.B-1, "Control Room"; Figure II.B-2, "Operational Support Center"; Figure II.B-3, "Technical Support Center"; and Figure II.B-4, "Emergency Operations Facility," illustrate the ERO and functional responsibilities for various positions performing the functions detailed in Table II.B.2, "Emergency Response Organization Functional Responsibilities."

Section II.B.4, "Fermi 3 Emergency Response Organization Staff," describes the positions, titles, and major tasks to be performed by persons assigned to functional areas of an emergency, which are all identified in the EPIPs. These assignments cover the functions listed in Table II.B-1, "Minimum Staffing Requirements for Emergencies," which describes minimum on-shift staffing by functional areas and augmented staffing during an Alert or higher. Table II.B-2 describes key positions and functional responsibilities for the overall ERO.

Table II.B-2 includes the responsibilities of the Radiation Protection Advisor in the TSC, who provides direction for radiation protection; Dose Assessors in the TSC, who perform onsite and offsite dose assessment and projections; Chemistry Technicians in the CR and TSC who perform dose assessments for potential and actual releases; Radiation Protection Coordinator in the EOF, who directs the Radiological Emergency Team (RET) Coordinator and Dose Assessors; and the Dose Assessor/Meteorological Assessor in the EOF, who performs dose assessments and projections.

Technical Evaluation: [B.1] {Appendix E, Section IV.A.2.b} The staff finds that the Fermi 3 Emergency Plan adequately describes the onsite ERO with a detailed discussion of the plant staff emergency assignments. This information is acceptable because it conforms to the requirements of Appendix E, Section IV.A.2.b of 10 CFR Part 50 and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.2.4 *Designation of an Emergency Coordinator*

Technical Information in the Emergency Plan: [B.2] Section II.B.1 states that the Shift Manager assumes responsibility as the Emergency Director upon a declaration of an emergency. This position has the responsibility and authority to initiate any required emergency response actions, including emergency classification changes; notification of Federal, State, local, and provincial authorities; and PARs to offsite authorities. The Emergency Director is responsible for coordinating the onsite emergency response under the direction and control of the Emergency Officer, when the EOF is declared operational.

Technical Evaluation: [B.2] The staff finds that the Fermi 3 Emergency Plan adequately identifies a designated individual as the Emergency Coordinator who shall be on shift at all times. This person shall have the authority and responsibility to immediately and unilaterally

initiate any emergency action, including providing PARs to authorities responsible for implementing offsite emergency measures. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.2.5 *Line of Succession for the Emergency Coordinator*

Technical Information in the Emergency Plan: [B.3] Section II.B.2, "Emergency Director Line of Succession," states that if the Shift Manager is rendered unable to fulfill the duties and responsibilities of the Emergency Director (e.g., due to personal illness or injury); the on-shift Unit Supervisor (a position that is also staffed at all times) assumes the Emergency Director position until relieved by the Plant Manager or a designated alternate. The normal line of succession would be from the Shift Manager to the Plant Manager or an alternate, after becoming fully familiar with the pertinent plant and radiological conditions and status of emergency response/accident mitigation efforts.

Technical Evaluation: [B.3] The staff finds that the Fermi 3 Emergency Plan adequately identifies a line of succession for the emergency coordinator position and the specific conditions for higher level utility officials to assume this function. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.2.6 *Responsibilities of the Emergency Coordinator*

Technical Information in the Emergency Plan: [B.4] {Appendix E, Section IV.A.2.c} Section II.B.3, "Emergency Director Responsibilities," lists these responsibilities that include implementing immediate onsite corrective and protective actions and initiating offsite notifications and PARs. Some Emergency Director responsibilities cannot be delegated, such as directly notifying and making PAR to governmental authorities; authorizing plant and emergency workers to receive radiation doses in excess of the 10 CFR Part 20 "Standards for Protection Against Radiation"; and limiting and authorizing the distribution and use of potassium iodide (KI). Section II.B.1 states that when the EOF is activated, the Emergency Officer is responsible for the overall direction and control of the entire activated ERO and for coordinating with offsite agencies. The position of Emergency Officer is to be filled by a qualified senior manager who will have the non-delegable responsibility to directly notify and make PARs to governmental authorities responsible for implementing offsite emergency response actions.

{Appendix E, Section IV.A.2.a} Section II.B.1 states that the Shift Manager will assume responsibility for and the position as Emergency Director upon the declaration of an emergency. This position has the responsibility and authority to initiate any required emergency response actions and is responsible for coordinating the onsite emergency response. Table II.B-2 summarizes these responsibilities.

Technical Evaluation: [B.4] The staff finds that the Fermi 3 Emergency Plan adequately establishes the functional responsibilities assigned to the Emergency Coordinator, and clearly specifies which responsibilities may not be delegated. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

{Appendix E, Section IV.A.2.a} The staff finds that the Fermi 3 Emergency Plan adequately describes the onsite ERO with a detailed discussion of the authority, responsibilities, and duties of the individual(s) who will take charge during an emergency. This information is acceptable because it conforms to the requirements in Appendix E, Section IV.A.2.c to 10 CFR Part 50.

13.3C.2.7 *On-shift and Augmentation Emergency Response Staff*

Technical Information in the Emergency Plan: [B.5.] {Appendix E, Section IV.A.9}
Section II.B, "Emergency Response Organization," describes the Fermi 3 ERO positions and associated responsibilities. It outlines the staffing responsible for providing initial emergency response actions and the timely augmentation of on-shift personnel. EPIPs provide the details of (1) ERO position descriptions, responsibilities, and major tasks to support initial emergency response actions; (2) the timely augmentation of notifications and communications; and (3) the activation and operation of the TSC, OSC, EOC, and JIC. In RAI 13.03-02-12, the staff requested the applicant to revise the Emergency Plan to include a description of the staffing for maintenance personnel that reflects Figure II.B-1. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), explains that on-shift maintenance personnel are assigned to the Damage Control and Rescue Team. In Supplemental RAI 13.03-11, the staff requested the applicant to describe the staffing of on-shift maintenance personnel to match the Figure II.B-1 position block diagram. The applicant's response to this RAI dated June 25, 2010 (ADAMS Accession No. ML101790463), states that Footnote 3 of Table II.B-1 will be revised to clarify that one individual qualified to provide mechanical maintenance support and one individual qualified to provide electrical maintenance support are on-shift; one individual qualified to provide electrical maintenance support and one individual qualified to provide instrumentation and control (I&C) maintenance support will respond within 30 minutes to an Alert or higher; and one individual qualified to provide mechanical maintenance support, one qualified Radwaste Operator, and one individual qualified to provide electrical maintenance support will respond within 60 minutes to an Alert or higher. The response further explains that Figure II.B-1 will be revised to indicate that the on-shift maintenance personnel are assigned to the Damage Control and Rescue Teams identified in Table II.B-1. In RAI 13.03-02-13, the staff requested the applicant to include in the Emergency Plan a description of the CR Communicator shown in Figure II.B-1. The applicant's response to these RAIs dated December 7, 2009 (ADAMS Accession No. ML093440828), states that Table II.B-1 of the Fermi 3 Emergency Plan describes the major tasks and organizational title associated with the CR Communicator position. The applicant also states in the response that the CR Communicator, at the direction of the CR Emergency Director, completes initial notification of and communications with Detroit Edison and State, local, and NRC EROs. In RAI 13.03-02-20 and RAI 13.03-02-21, the staff requested additional information regarding the Emergency Director and Emergency Officer, respectively. The applicant's responses to these RAIs dated December 7, 2009 (ADAMS Accession No. ML093440828), included a revised Table II.B-2 with the Emergency Officer's responsibility to direct the notification of governmental authorities and make PARs to these authorities.

Section II.B.1 states that the designated minimum staffing required to conduct routine and immediate emergency operations is maintained in accordance with 10 CFR 50.54(m) and the Fermi 3 technical specifications. Section 13.1 of the FSAR provides further details of the normal plant organization and reporting relationships.

Table II.B-1 describes Detroit Edison's intent to achieve the 30- and 60-minute augmentation times indicated in Table B-1 of NUREG-0654/FEMA-REP-1, Revision 1, and in Supplement 1 to NUREG-0737, "Clarification of TMI Action Plan Requirements." On-shift personnel are considered to be immediately available to respond to the emergency situation and to initiate emergency response actions. The normal complement of on-shift personnel is augmented according to the emergency classification.

Section II.C.2, “Offsite Organization Representation in the EOF,” describes the Detroit Edison personnel assignment as liaisons to the State, Monroe County, and Wayne County EOCs, upon their activation. These representatives act as technical liaisons providing plant status and emergency activity information updates to the offsite agencies. In RAI 13.03-02-17, the staff requested the applicant to revise Table II.B-2 of the Emergency Plan to include the Emergency Director’s responsibilities described in Section II.A.1.b, such as the activation of the ERO and the direction of initial notifications of PARs. In the response to RAI 13.03-02-17 dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant revised Table II.B-2 to show the responsibilities of the Shift Manager/Emergency Director to direct initial notifications of PARs and to activate the ERO. In RAI 13.03-02-19, the staff requested an explanation as to how a position in the augmenting ERO will perform the call-in of the team. In the response to RAI 13.03-02-19 dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant revised Table II.B-2 of the Fermi 3 Emergency Plan to show how the responsibilities of the CR Emergency Director will ensure that Detroit Edison personnel are called out as conditions warrant.

Section II.B.4, “Fermi 3 Emergency Response Organization Staff,” states that Detroit Edison will provide for minimum staffing of the Fermi 3 ERO that is consistent with Table II.B-1 of this Emergency Plan (based on Table B-1 of NUREG-0654). Table II.B-2 describes the key Fermi 3 ERO positions and their functional responsibilities. In RAI 13.03-02-07, the staff requested the applicant to revise the notification/communication functions in Table II.B.1 to be consistent with Table B-1 of NUREG-0654. In the response to RAI 13.03-02-07 dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant explained that Non-Licensed Operators are assigned the notification/communication functions and as Non-Licensed Operators, these individuals are also assigned other functions. In Supplemental RAI 13.03-08, the staff requested the applicant to revise Table II.B.1 of the Fermi 3 Emergency Plan to designate one of the excess Non-Licensed Operators as dedicated to the notification/communication functions, with no additional assigned functions. The applicant’s response to RAI 13.03-08 dated June 25, 2010 (ADAMS Accession No. ML101790463), states that Table II.B-1 and Figure II.B-1 will be revised to indicate that one on-shift, Non-Licensed Operator will be designated to perform only the notification/communication functions.

In RAI 13.03-02-09, the staff requested the applicant to revise the areas of expertise list in the Table II.B.1 “Plant System Engineering, Repair, and Corrective Actions” section to be consistent with the NUREG-0654 Table B-1 listing. The applicant’s response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), states that Non-Licensed Operators are qualified to perform radwaste operations during emergencies, which is reflected in a revision to Table II.B-1 that identifies core/thermal hydraulics and electrical and mechanical engineering analyses as technical support. These technical support and maintenance personnel will be assigned to the Damage Control and Rescue Team, and a footnote to Table II.B-1 will be added to clarify that one Non-Licensed Operator may be assigned the Radwaste Operator duties to support emergency response or recovery activities, as needed.

In RAI 13.03-02-10, the staff requested that Table II.B-1 be revised to include “firefighting communications.” In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant revised Table II.B-1 of the Emergency Plan to include “firefighting communications.” In RAI 13.03-02-11, the staff requested the applicant to describe who the shift personnel are and their qualifications that allow them to fill the designated position in Table II.B-1. The applicant’s response dated December 7, 2009 (ADAMS Accession No. ML093440828), explains that the Table II.B-1 footnote indicates that the corresponding staff

numbers are not included in the stated total number in the table, and the individuals filling the asterisked emergency response positions in the table may be assigned multiple tasks. The applicant also notes that on-shift Operations and Maintenance personnel fulfill the primary functions assigned to the Damage Control and Rescue Teams, with support from Radiation Protection Technicians. In addition, on-shift Maintenance personnel are also assigned to complete the "Repair and Corrective Actions" tasks. In Supplemental RAI 13.03-10.b, the staff requested the applicant to clarify the inconsistency between Table II.B-1 data and Footnote 3. In the response to this RAI dated June 25, 2010 (ADAMS Accession No. ML101790463), the applicant states that Footnote 3 of Table II.B-1 will be revised to clarify that one individual qualified to provide mechanical maintenance support and one individual qualified to provide electrical maintenance support are on-shift; one individual qualified to provide electrical maintenance support and one individual qualified to provide I&C maintenance support will respond within 30 minutes of an Alert or higher; and one individual qualified to provide mechanical maintenance support, one qualified Radwaste Operator, and one individual qualified to provide electrical maintenance support will respond within 60 minutes to an Alert or higher.

Section II.B describes the key Fermi 3 ERO positions and associated responsibilities. This section outlines the staffing needed to provide initial emergency response actions and the timely augmentation of on-shift personnel, when required. The EPIPs provide ERO position descriptions, responsibilities, and major tasks of the ERO staffing required for initial emergency response actions, in addition to provisions for the timely augmentation of notifications/communications and ERF activation and operation

{Appendix E, Section IV.A.9} The applicant's proposed license condition to be incorporated into the Fermi 3 COL application, Part 10, states the following;

> The licensee shall submit a detailed analysis of on-shift staffing, in accordance with NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities" Revision 0, and the licensee shall incorporate any changes to the Emergency Plan needed to bring staff to the required levels, prior to or concurrent with completion of Emergency Plan ITAAC 2.0 of Emergency Plan ITAAC Table 2.3. 1, and no less than 180 days prior to initial fuel load.

The staff revised the proposed license condition as follows:

> The licensee shall conduct a detailed analysis of on-shift staffing, in accordance with the NRC endorsed version of NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," Revision 0, and the licensee shall incorporate any changes to the Emergency Plan needed to bring staffing to the required levels, prior to or concurrent with completion of Emergency Plan ITAAC 2.0 of Emergency Plan ITAAC Table 2.3.1.

Technical Evaluation: [B.5] The staff finds the additional information and textual revisions to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-02-07, RAIs 13.03-02-09 through 13.03-02-13, RAI 13.03-02-17, RAIs 13.03-02-19 through 13.03-02-21, Supplemental RAI 13.03-08, RAI 13.03-10.b, and RAI 13.03-11 acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the responses to the RAIs listed above. The staff finds that the revisions to Table II.B-1, Table II-B-2, and Figure II.B-1 in the Fermi 3 Emergency Plan adequately describe the ERO positions and

associated responsibilities. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Evaluation: {Appendix E, Section IV.A.9} The staff finds that the applicant's proposed license condition adequately addresses the required detailed analysis of on-shift staffing. This change is acceptable because it conforms to the guidance in NSIR/DPR-ISG-01. Verification that a future revision of the COL application incorporates this license condition was tracked as Confirmatory Item 13.03-77. The staff verified that the proposed license condition is included in Section 3.7 of Part 10 to the COL application Revision 7. Therefore, Confirmatory Item 13.03-77 is resolved.

13.3C.2.8 *Interfaces Between Functional Areas*

Technical Information in the Emergency Plan: [B.6] Figure II.A-1, "Emergency Operation Center Interrelationships," shows the interfaces between and among the site functional areas of emergency response activities, Corporate Headquarters, State of Michigan, Monroe and Wayne Counties, Province of Ontario (Canada), and Federal agencies. In RAI 13.03-01-01, the staff requested a description of the interactions with the Province of Ontario. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant described the interactions with the Province of Ontario that include (1) notifications; (2) interactions at the EOF; and (3) interactions at the JIC. The applicant stated that interactions with the EOF and JIC are discussed in Sections II.C.2 and II.G.3, respectively, of the Fermi 3 Emergency Plan. The applicant provided a revised Figure II.B-4 identifying a liaison to the Province of Ontario. Additionally, the applicant's revised text to Section II.E.1.b.3 of the Emergency Plan specifies an initial notification to the Province of Ontario. In RAI 13.03-02-05 the staff requested the applicant to include in the block diagram interfaces between and among the onsite functional areas of emergency activities; licensee headquarters support; local services support; and State and local government response organization, including the TSC, OSC, and EOF. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant stated that Figure II.A-1 will be revised to show interfaces with the TSC and OSC in a revision to the Emergency Plan.

Roles of the State Police, MDEQ, and MDCH are described in Section II.A.1.b, "Concept of Operations." In RAI 13.03-01-03, the staff requested the applicant to include the roles of the State Police, MDEQ, MDCH, DOE, EPA, and USCG in Figure II.A-1. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), stated that the Michigan State Police, MDEQ, and MDCH are included in Figure II.A-1 under the listing for "Emergency Support Functions," as shown in the "State Emergency Operations Center" box of Figure II.A-1. The applicant stated that because the DOE manages the Federal Radiological Monitoring and Assessment Center (FRMAC), DOE is included in the "Federal Radiological Monitoring and Assessment Center (FRMAC)" box in Figure II.A-1. The applicant also notes that because the activities of the EPA and Coast Guard do not occur in one of the EOCs, these organizations are not included in Figure II.A-1.

Section II.A.1.a.1 identifies the Province of Ontario as a participating organization, and the Ontario EOC is included in Figure II.A-1 under "Adjacent States."

Technical Evaluation: [B.6] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAIs 13.03-01-01, 13.03-01-03, and RAI 13.03-02-05 acceptable because they conform to the guidance in

NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the responses to the RAIs listed above. The staff also finds that the Fermi 3 Emergency Plan adequately specifies the interfaces between and among the onsite functional areas of emergency activities, licensee headquarters support, local services support, and State and local government response organization; in addition to illustrating them in a block diagram that includes the onsite TSC, OSC, and EOF. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.2.9 *Corporate Support*

Technical Information in the Emergency Plan: [B.7] {Appendix E, Section IV.A.3} Section II.B.6, "Detroit Edison Headquarters Support for the Fermi 3 Emergency Response Organization," explains that corporate support functions include notifications and communications to other organizations not directly involved in the emergency response and keeping upper management and other company locations informed of emergency activities. Figure II.A-1 illustrates the interfaces of site functional areas of emergency response activities and the Corporate Headquarters. In RAI 13.03-02-02, the staff requested additional information regarding the applicant's Corporate Headquarters personnel interface with other functional areas. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant revises Figure II.A-1 of the Fermi 3 Emergency Plan to include the interface with Detroit Edison Corporate Headquarters.

Technical Evaluation: [B.7] {Appendix E, Section IV.A.3} The staff finds the additional information submitted in response to RAI 13.03-02-02 acceptable, because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes provided in the response to RAI 13.03-02-02. The staff finds that the Fermi 3 Emergency Plan adequately describes who among the corporate management, administrative, and technical support personnel will augment plant staffing during emergency events. This information is acceptable because it conforms to the requirements in Appendix E, Section IV.A.3 to 10 CFR Part 50 and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.2.10 *Contractor and Private Organizations Support*

Technical Information in the Emergency Plan: [B.8] {Appendix E, Section IV.A.5} Section II.B.7, "Support from Contractor and Private Organizations," identifies and describes assistance from the following supporting contractors and private organizations: Institute of Nuclear Power Operations (INPO), General Electric-Hitachi (GEH), the DOE Radiation Emergency Assistance Training Center/Training Site, and other private sector medical service agencies including Mercy Memorial Hospital; Oakwood Southshore Medical Center; a local ambulance services; Entergy Nuclear Palisades LLC; Indiana Michigan Power; and American Nuclear Insurers.

In RAI 13.03-02-04, the staff requested the identification of employees and non-employees by position and title who have special qualifications for coping with emergency situations. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant stated that the scope of responsibilities of external organizations that may be called upon to assist in emergency response activities will be identified in properly executed LOAs or other legal instruments consistent with the requirements of 10 CFR 50.33(g). The applicant

states that the list of public and private sector organizations in Section II.A of the Emergency Plan encompasses the full range of emergency response expertise that may be called upon for assistance in emergencies. The applicant further states that no other persons with special qualifications outside of those described in Sections II.A and II.B have been identified.

Technical Evaluation: [B.8] {Appendix E, Section IV.A.5} The staff finds the additional information submitted in response to RAI 13.03-02-04 acceptable because it conforms to the requirements in Appendix E to 10 CFR Part 50, Section IV.A.5 and the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff finds that the Fermi 3 Emergency Plan adequately specifies contractors and private organizations that may be requested to provide technical assistance to and augmentation of the ERO. This information is acceptable because it conforms to the requirements in Appendix E to 10 CFR Part 50, Section IV.A.5 and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.2.11 *Local Emergency Response Support*

Technical Information in the Emergency Plan: [B.9] {Appendix E, Section IV.A.6} Section II.B.8, "Local Emergency Response Support," describes the agreements established and maintained with outside support agencies that include law enforcement, fire protection, and ambulance and hospital support. Section II.L, "Medical and Public Health Support," describes hospital and medical support, onsite first aid capabilities, and medical transportation.

Appendix 2 includes certification letters from the Michigan State Police, Monroe County Emergency Management Division, Wayne County Department of Homeland Security & Emergency Management, Frenchtown Charter Township Fire Department, Mercy Memorial Hospital Corporation, Monroe County Ambulance, and Oakwood Southshore Medical Center. These letters indicate that the specific nature of emergency response arrangements will be established in agreements, and existing agreements will be revised if and when the applicant proceeds with construction and operation of the new plant. In RAI 13.03-01-05, the staff requested copies of existing agreements with signature pages from organizations identified in Appendix 2 to show that these agreements delineate authorities, responsibilities, and action limits. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant stated that Letters of Agreement (LOAs) supporting the proposed Fermi 3 COL application Emergency Plan have not yet been executed. In Supplemental RAI 13.03-07, the staff requested the applicant to include in the Emergency Plan copies of the LOAs. In the response to Supplemental RAI 13.03-07 dated June 25, 2010 (ADAMS Accession No. ML101790463), the applicant stated that certification letters have been obtained from the support agencies, and formal LOAs will be executed prior to loading fuel at Fermi 3. The response also proposed a license condition to address the inclusion of LOAs in the Emergency Plan prior to the initial fuel load.

Technical Evaluation: [B.9] {Appendix E, Section IV.A.6} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-01-05 and Supplemental RAI 13.03-07 acceptable, because the information conforms to the requirements of Appendix E, Section IV.A.6 and the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 7 of the Fermi 3 FSAR and Part 10 of the COL application incorporate the information and textual changes in the responses to the RAIs listed above. The staff finds that the Fermi 3 Emergency Plan and the EP-ITAAC in the COL application, Part 10, adequately identify the services that may be needed during an emergency and commit to establishing LOAs with agencies that will provide those

services. This information is acceptable because it conforms to the requirements of Appendix E, Section IV.A.6 and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.2.12 *Conclusion*

NRC staff reviewed the onsite emergency plan, as described above, for the onsite emergency organization. NRC staff concludes that the information in the Fermi 3 Emergency Plan and the FSAR is acceptable, because it meets the requirements of 10 CFR 50.47(b)(2) and conforms to the guidance in Planning Standard B of NUREG-0654/FEMA-REP-1, Revision 1 and the applicable requirements of Appendix E to 10 CFR Part 50, as described above.

13.3C.3 Emergency Response Support and Resources

13.3C.3.1 *Regulatory Basis*

To determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(3), the staff evaluated the plan against the detailed evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against applicable regulatory requirements related to the area of "Emergency Response Support and Resources" in Appendix E to 10 CFR Part 50.

13.3C.3.2 *Person Authorized to Request Federal Support*

Technical Information in the Emergency Plan: [C.1.a] Section II.C.1, “Federal Response Capability,” explains that the Emergency Director or the Emergency Officer (when the EOF is activated) is responsible for requesting Federal assistance as needed. Section II.B states that the Emergency Director is authorized to obtain assistance from offsite support organizations.

Technical Evaluation: [C.1.a] The staff finds that the Fermi 3 Emergency Plan adequately addresses the person authorized to request Federal support. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.3.3 *Expected Assistance from State, Local, and Federal Agencies*

Technical Information in the Emergency Plan: [C.1.b] {Appendix E, Section IV.A.7} Section II.B.8 states that the Fermi 3 EPIPs, or LOAs with offsite response organizations (OROs), identify ORO resource availability and their applicable integration into site activities during an emergency event; including hostile action-based (HAB) events at the Fermi site. The procedures or LOAs identify ORO resources and coordination for potential simultaneous onsite and offsite ORO support, including coordination between security and EP resources that may be called upon during a radiological emergency scenario involving HAB events at the Fermi site. In RAI 13.03-95, the staff asked that the title of the EPIP containing the described information and what actions would be taken if shortfalls in ORO resources were found. In the response to this RAI dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant stated that the EPIP titled “Maintaining Emergency Preparedness” identifies and describes the requirements for the annual review of LOAs; as well as actions to be taken if shortfalls are noted. In addition, Section II.P.3 of the Fermi 3 Emergency Plan will also be revised to capture this information.

Section II.C, “Emergency Response Support and Resources,” describes that the FRMAC Advance Party could be expected in the site vicinity within 12 hours following the order to deploy, and assistance from the NRC offices in Chicago (Illinois) will arrive in the site vicinity within 5 hours following notification. Support is available from the Oak Ridge DOE under the DOE Radiological Assistance Program; Oak Ridge includes medical support from the Radiation Emergency Assistance Center/Training Site. Section C.1.e identifies the State EOC in Lansing, Michigan, or an alternate State EOC in Northville, Michigan, and the Wayne Count EOC in Romulus, Michigan, as available sites that will support the Federal response. The Emergency Operations Plan for Wayne County and the Emergency Management Plan for Monroe County each describe their respective EOCs. Section C.2, “Offsite Organization Representation in the EOF,” explains that the State of Michigan team will interface with plant personnel to (1) perform radiological dose calculations; (2) determine offsite PARs; and (3) coordinate field monitoring team activities.

Technical Evaluation: [C.1.b] {Appendix E, Section IV.A.7} The staff finds that the additional information and the textual revision to the Fermi 3 Emergency Plan submitted in the response to RAI 13.03-95 are acceptable. The applicant described the requirements for the annual review of LOAs, as well as actions to be taken if shortfalls are noted. This information is thus acceptable because it conforms to the guidance in NSIR/DPR-ISG-01, Section IV.D. The staff also finds that the Fermi 3 Emergency Plan adequately identifies the assistance expected from appropriate State, local, and Federal agencies with responsibilities for coping with emergencies. This information conforms to the requirements in Appendix E to 10 CFR Part 50, Section IV.A.7; and the guidance in NUREG–0654/FEMA-REP-1, Revision 1, and NSIR/DPR-ISG-01. Verification that a future revision of the COL application incorporates the acceptable changes in RAI 13.03-69 was tracked as Confirmatory Item 13.03-78. The staff verified that the proposed changes in the RAI response are included in Part 5 to the COL application Revision 7. Therefore, Confirmatory Item 13.03-78 is resolved.

13.3C.3.4 *Resources to Support the Federal Response*

Technical Information in the Emergency Plan: [C.1.c] Section II.C, “Emergency Response Support and Resources,” lists airfields in the vicinity of the plant that may be used by emergency support groups, including two helicopter pads on the site. Additional provisions for incorporating the Federal response capability include the need for the applicant to provide facilities and resources to support the Federal response through the EOF. Office space and communications equipment are available for NRC personnel in the TSC, EOF, and JIC. State and local command centers that may be available to support the Federal response include the State EOC, the Monroe County EOC, and the Wayne County EOC. Section II.B states that the EOF administrator coordinates logistical support for onsite emergency personnel. In RAI 13.03-03-01, the staff requested a description of on-site provisions such as available office space for Federal, State, and local emergency personnel. In the response, to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant stated that Section II.C.1.d of the Emergency Plan indicates the facilities and resources that are available at the EOF to support the Federal response, in addition to office space and communications equipment for NRC personnel in the TSC, EOF, and JIC, as described in Section II.H.1. The applicant also stated that Section II.H.1.c of the Emergency Plan specifies that the TSC provides work space for five NRC representatives, and Section II.H.1.d indicates that the EOF provides workspace for State and local representatives.

Technical Evaluation: [C.1.c] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-03-01 acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-03-01. The staff finds that the Fermi 3 Emergency Plan adequately describes provisions for incorporating the Federal response capability into its operation plan including specific licensee, State and local resources available to support the Federal response. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.3.5 *Representatives to Offsite Governments*

Technical Information in the Emergency Plan: [C.2.b] Section II.C states that personnel are assigned as liaisons to the State, Monroe County, Wayne County, and Province of Ontario EOCs when they are activated.

Technical Evaluation: [C.2.b] The staff finds that the Fermi 3 Emergency Plan adequately addresses the dispatch of a representatives to principal offsite governmental EOCs. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.3.6 *Radiological Laboratory Support*

Technical Information in the Emergency Plan: [C.3] Section II.C identifies fixed and mobile radiological laboratories, their radiation monitoring and analytical capabilities, and the advance time needed to respond following notification. This section also explains that these laboratories are available to support emergency response activities on a 24-hour per day basis.

Technical Evaluation: [**C.3]** The staff finds that the Fermi 3 Emergency Plan adequately identifies radiological laboratories and their general capabilities and expected availability to provide radiological monitoring and analytical services that can be used in an emergency. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.3.7 *Other Sources of Assistance*

Technical Information in the Emergency Plan: [C.4] Section II.C states that the applicant has made arrangements to obtain additional emergency response support from the INPO Fixed Nuclear Facility Voluntary Assistance Agreement signatories. This section also states that GEH has an emergency support program in place to provide design engineering expertise, specialized equipment, and other services. Appendix 2 of the Fermi 3 Emergency Plan provides a list of the certification letters established between the applicant, the State of Michigan, Monroe and Wayne County agencies, and private sector organizations committed to supporting the implementation of the Emergency Plan. The original agreements are kept on file by Fermi 3 Emergency Preparedness or the applicant's Contract Services. The certifications letters are from the Michigan State Police; Monroe County Emergency Management Division; Wayne County Department of Homeland Security & Emergency Management; Frenchtown Charter Township Fire Department; Mercy Memorial Hospital Corporation; Monroe Community Ambulance; and Oakwood Southshore Medical Center. In RAI 13.03-01-05 and Supplemental RAI 13.03-07 (described in Section 13.3C.1.7 "Written Agreements"), the staff requested the

applicant to include copies of the LOAs in the Emergency Plan. In the response to Supplemental RAI 13.03-07 dated June 25, 2010 (ADAMS Accession No. ML101790463), the applicant proposed a license condition stating that the LOA will be obtained before loading fuel at Fermi 3.

{Appendix E, Section III} Section II.C.2, "Offsite Organization Representation in the EOF," of the Fermi 3 Emergency Plan identifies the role of the State of Michigan to perform radiological dose calculations and generate PARs. Section II.C.4, "Other Supporting Organizations," identifies the roles of the INPO Fixed Nuclear Facility Voluntary Assistance Agreement signatories and GEH, which has an emergency support program in place to provide design engineering expertise, specialized equipment, and other services. In addition, a mutual assistance agreement exists with other utilities for offsite environmental monitoring.

Technical Evaluation: [C.4] The staff finds that the proposed DTE license condition adequately addresses the required detailed analysis of on-shift staffing submitted in response to RAI 13.03-01-05 and Supplemental RAI 13.03-07. The staff thus finds the proposed change acceptable because it conforms to the guidance in NSIR/DPR-ISG-01. The staff confirmed that the Fermi 3 COL application, Part 10 Revision 4, incorporates the license condition described above.

{Appendix E, Section III} The staff finds that the Fermi 3 Emergency Plan adequately describes the applicant's operational role, concept of operations, and relationship to the total effort. This information is acceptable because it conforms to the requirements in Appendix E to 10 CFR Part 50, Section III.

13.3C.3.8 *Conclusion*

NRC staff reviewed the onsite emergency plan as described above, for the emergency response support and resources. NRC staff concludes that the information in the Fermi 3 Emergency Plan is acceptable because it meets the requirements of 10 CFR 50.47(b)(3); complies with the guidance in Planning Standard C of NUREG-0654/FEMA-REP-1, Revision 1; and complies with the applicable portions of Appendix E to 10 CFR Part 50, as described above.

13.3C.4 Emergency Classification System

13.3C.4.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(4), the staff evaluated the plan against the detailed evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed plan against applicable regulatory requirements related to the "Emergency Classification System" in Appendix E to 10 CFR Part 50.

13.3C.4.2 *Emergency Classification System*

Technical Information in the Emergency Plan: [D.1 and D.2] {Appendix E, Section IV.B and C} Section II.D, "Emergency Classification System," of the Fermi 3 Emergency Plan describes the standard emergency classification and action level schemes based on system and effluent parameters that affected State and local response organizations may rely on for

determining initial offsite response measures. The Fermi 3 EPIP for emergency classifications will provide the parameter values and equipment status that are indicative of each emergency class. Changes to this EPIP will be in accordance with the requirements of 10 CFR 50.54(q) and the guidance in Regulatory Issue Summary (RIS) 2005-02, "Clarifying the Process for Making Emergency Plan Changes." Section II.I, "Accident Assessment," further describes the availability and location of initial and continuing information for an accident assessment throughout the course of an event. This information includes plant parameter display systems, a liquid and gaseous sampling system, area and process radiation monitoring systems, and accident radiation monitoring systems including high-range containment radiation monitors.

Section II.D.1, "Classification System," describes the emergency classification system in use, including the four emergency classes described in Appendix E to 10 CFR 50: Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency. Each classification in the system is characterized by Emergency Action Levels (EALs) or initiating conditions that address emergencies of increasing severity. In RAI 13.03-17, the staff requested the applicant to address plans to finalize the Fermi 3 Emergency Classification and Action Level Scheme and provided them with two options. In the response to this RAI dated September 24, 2009 (ADAMS Accession No. ML092720656), the applicant selects Option 2 for the Fermi 3 Emergency Plan. Option 2 requires the applicant to submit an emergency plan section that describes the emergency classification system and addresses four critical elements required for an EAL scheme.

Section II.D.2, "Emergency Action Levels (EALs)," states that emergency classifications are characterized by EALs that are consistent with the general class descriptions in accordance with RG 1.101. The EALs, where possible, are related to plant instrumentation readings and are classified by determining which EAL-initiating conditions have been met.

Technical Evaluation: [D.1 and D.2] {Appendix E, Section IV.B and IV.C} The staff reviewed the proposed license condition (COM 13.4-031) to be added to the Fermi 3 FSAR, Chapter 13, Table 13.4-201, which states that "The licensee shall submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07-01, Revision 0, with no deviations. The fully developed site-specific EAL scheme shall be submitted to the NRC for confirmation at least 180 days prior to initial fuel load."

The staff finds the additional information and textual revisions to the Fermi 3 Emergency Plan in the response to RAI 13.03-17 acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan the information and textual changes provided in the response to RAI 13.03-17. The staff finds that the Fermi 3 Emergency Plan provides an adequate overview of its EAL scheme, its general list of licensee actions at each emergency classification level and its commitment to control the EALs in accordance with 10 CFR 50.54(q).

The staff finds the proposed EAL scheme license condition and response to RAI 13.03-17 acceptable because they conform to the requirements of Appendix E to 10 CFR Part 50, Sections IV.B and IV.C, and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.4.3 *Emergency Action Levels Review by State and Local Authorities*

Technical Information in the Emergency Plan: {Appendix E, Section IV.B} Section II.D.3, "State/Local Emergency Action Level Scheme," states that Detroit Edison is coordinating with the State of Michigan and Monroe and Wayne Counties to ensure consistency between the classification schemes. State, county, and provincial authorities review the content of the EALs on an annual basis. Detroit Edison informs the offsite governmental agencies of any EAL changes that significantly impact the initial conditions or technical basis.

Technical Evaluation: {Appendix E, Section IV.B} The staff finds that the Fermi 3 Emergency Plan and license condition COM 13.4-031—discussed in Section 13.3.4 of this SER—adequately describe how the initial EAL schemes will be discussed with and agreed to by the State, county, and provincial authorities, who will hold an annual EAL review meeting to discuss any changes in the scheme. This information is acceptable because it conforms to the requirements of 10 CFR Part 50, Appendix E, Section IV.B, for licensees to annually review their EAL schemes with offsite stakeholders.

13.3C.4.4 *Conclusion*

NRC staff reviewed the Fermi 3 Emergency Plan as described above for the emergency classification system. The NRC staff concludes that the information provided to describe the EAL scheme is acceptable because it conforms to the requirements of 10 CFR 50.47(b)(4), Appendix E to 10 CFR Part 50, Sections IV.B and IV.C, and the guidance in Planning Standard D of NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.5 Notification Methods and Procedures

13.3C.5.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(5), the staff evaluated the plan against the detailed evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed plan against applicable regulatory requirements related to "Notification Methods and Procedures" in Appendix E to 10 CFR Part 50 and 10 CFR 50.72.

13.3C.5.2 *Notification Procedures, Capabilities, and Agreements*

Technical Information in the Emergency Plan: [E.1] {Appendix E, Section IV.D.1 and D.3} Section II.E, "Notification Methods and Procedures," of the Fermi 3 Emergency Plan states that the Emergency Director in the CR or TSC—or the Emergency Officer in the EOF—is responsible for notifying State, county, and Federal agencies in accordance with the EPIPs. Section II.E also explains that specific requirements for notifications to the NRC about classified emergency events are detailed in 10 CFR 50.72, and guidance can be found in the EPIPs. Appendix 6, "Emergency Plan Implementing and Supporting Procedures (Typical List) and Procedure Cross-Reference to Plan," identifies a procedure for notifications/communications.

Section II.E states that the Province of Ontario is notified immediately after the NRC and only once at each initial emergency classification of an Unusual Event, Alert, Site Area Emergency, or General Emergency. Section II.E also states that an event will be reported to the NRC Operations Center immediately after notifying the appropriate State and county agencies, but no

later than one hour after the time of initial classification, escalation, termination, or entry into the recovery phase. In RAI 13.03-05-01, the staff requested the applicant to explain how notifying the Province of Ontario an hour or more after an initial emergency declaration is considered early notification to the populace. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant describes interactions with the Province of Ontario, including an initial notification within one hour of the specified initiating conditions. The applicant states that for the existing Fermi 2 facility, requirements for notifying Federal, State, and local officials—including the Province of Ontario—are established in the EPIP, "Emergency Notifications." Appendix 6 of the Fermi 3 Emergency Plan lists an EPIP entitled, "Notifications/Communications."

Section II.E states that the applicant will notify the State of Michigan and Monroe and Wayne Counties within 15 minutes of a declared emergency at Fermi 3. This section also outlines the content of initial and follow-up messages to response organizations within the 16-km (10-mi) Plume Exposure Pathway EPZ. Section II.E also states that the State and county emergency response plans describe procedures for State and county officials to make a public notification decision promptly after notification from Fermi 3 of an emergency. The system for disseminating information to the public includes releasing prescribed messages through appropriate broadcast media, such as the emergency alert system (EAS). In addition, the counties will activate the alert and notification system (ANS) upon direction from State or local authorities. The ANS can be activated within 15 minutes of a determination to notify the public.

Technical Evaluation: [E.1] {Appendix E, Section IV.D.1 and D.3} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-05-01 acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-05-01. The staff finds that the Fermi 3 Emergency Plan adequately describes the procedures used to address a mutually agreeable basis for notification and means of verification. This information is acceptable because it conforms to the emergency classification guidance in NUREG-0654/FEMA-REP-1, Appendix 1, “US Nuclear Regulatory Commission Emergency Action Level Guidelines for Nuclear Power Plants,” and the requirements in 10 CFR Part 50, Appendix E, Sections IV.D.1 and D.3.

13.3C.5.3 *Notification and Activation of the Emergency Response Organization*

Technical Information in the Emergency Plan: [E.2] {Appendix E, Section IV.C} Section II.A.1.b states the Emergency Director directs the activation of the Fermi 3 ERO for emergencies classified as Alert, Site Area Emergency and General Emergency. The Emergency Director may direct the activation of all or part of the Fermi 3 ERO for a Notification of Unusual Event, based on an assessment of plant conditions and support needs.

Section II.E describes the Plant Announcement (Page)/Party Line (PA/PL) System as the primary means for notifying onsite personnel. The CR will make an announcement that an emergency has been declared and what actions should be taken. ERO members will be instructed to respond to their designated ERF. The CR will also notify onsite and offsite personnel assigned to the ERO using an automatic callout system or a commercial telephone as a backup. Appendix 6, “Emergency Plan Implementing and Supporting Procedures (Typical List) and Procedure Cross-Reference to Plan,” identifies a notification/communication procedure.

Technical Evaluation: [E.2] {Appendix E, Section IV.C} The staff finds that the Fermi 3 Emergency Plan adequately addresses procedures for alerting, notifying, and mobilizing emergency response personnel. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Section IV.C, and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.5.4 *Initial Message Content to Offsite Response Organizations*

Technical Information in the Emergency Plan: [E.3] {Appendix E, Section IV.A.4 and IV.C} Section II.E of the Fermi 3 Emergency Plan lists the content of initial notification messages established between the applicant and the State and county agencies for a classified emergency. The initial notification message will contain plant contact information (location, date, and time); current classification of emergency and circumstances; whether a release is taking place; basic meteorological data; any recommended PARs; and potentially affected populations or areas. In RAI 13.03-05-01, the staff requested the applicant to provide additional information and revise the plan's described timing for the notification of the Province of Ontario, or provide a justification for why and how this meets the intent for early notification of the public.

Technical Evaluation: [E.3] {Appendix E, Section IV.A.4 and IV.C} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-05-01, dated December 7, 2009 (ADAMS Accession No. ML093440828) acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-05-01. The staff finds that the Fermi 3 Emergency Plan adequately describes the message authentication scheme. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Sections IV.A.4 and IV.C, and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.5.5 *Follow-up Messages to Offsite Response Organizations*

Technical Information in the Emergency Plan: [E.4] Section II.E states that for all emergency classifications, follow-up messages will be issued from the plant to affected State and local authorities to provide further details about the emergency. Available and appropriate information will be supplied including plant contact information (location, date, time); meteorological data (wind speed and direction, stability class, and precipitation); reactor information; plant status and updates; offsite release dose data; calculated and projected dose rates; and measured offsite radiation levels.

Technical Evaluation: [E.4] The staff finds that the Fermi 3 Emergency Plan adequately provides for follow-up messages from the facility to offsite authorities. The staff verified that the nature of the information provided is consistent with the requirements of the State and local emergency plans. This is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.5.6 *Notification of the Public*

Technical Information in the Emergency Plan: [E.6] {Appendix E, Section IV.D.3} Section II.E states that the siren system is designed to be operationally segregated by the county boundary within the 10-mile radius. The ANS signal will be a three (3) minute steady

signal. Upon determination of the need for public notification, the ANS can be activated within 15 minutes.

The "Cross-Reference of Fermi 3 Emergency Plan to Other Regulations and Regulatory Documents In Accordance with RG 1.206, Section C.I.13.3.1" provided as "Supplemental Information" to the Fermi 3 Emergency Plan identifies the sections within the State of Michigan Emergency Management Plan and the Monroe and Wayne County emergency plans where information is provided on an administrative means for notification.

Section II.E.5, "Instructions to the Public in the Plume Exposure EPZ," states that the capability exists for the prompt notification of the general public within the 10-mile Plume Exposure EPZ around the Fermi 3 site. This notification capability consists of two (2) principal elements: 1) the alert and notification system (ANS), and 2) the EAS radio and television stations. The locations of the sirens were determined by a comprehensive engineering study that addressed population density, geographical features, siren output, and the mounting heights of sirens to ensure coverage of the EPZ. The siren system is designed to be operationally segregated by the county boundary within the 16-km (10-mi) radius. In RAI 13.03-99, the NRC staff requested a description of the applicant's backup ANS capability as required by 10 CFR Part 50, Appendix E, Section IV.D.3. In the response to this RAI dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant provided a description of an intranet-based mass notification service that can send emergency messages to geo-coded (by address) telephones throughout the Michigan portion of the Fermi 16-km (10-mi) EPZ. The State of Michigan provided the system's design to FEMA for review and received FEMA's approval, which is contingent upon the completion of an initial testing program.

Section II.E.5 also describes that the operational state of readiness for the ANS is maintained under an agreement with the local agencies to test the system by sounding the sirens on a periodic basis that meets or exceeds FEMA guidance. Reports of inoperable equipment are provided to maintenance personnel designated by the Fermi 3 Emergency Preparedness Department. The testing and maintenance program identifies inoperable equipment in a timely manner and restores the equipment to a functional status commensurate with FEMA operability requirements and in accordance with FEMA-REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants." In addition to the routine test and repair program, preventive maintenance of the ANS will be performed on an annual basis, as described in the plant procedures.

Technical Evaluation: [E.6] The staff finds that the Fermi 3 Emergency Plan adequately establishes the administrative and physical means, in addition to the time required, for notifying and providing prompt instructions to the public in the plume exposure pathway EPZ. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Evaluation: {Appendix E, Section IV.D.3} The staff finds the additional information submitted in the response to RAI 13.03-99 to be acceptable because it conforms to the guidance in NSIR/DPR-ISG-01, Section IV.J. The staff also finds that the Fermi 3 Emergency Plan adequately describes the backup public alert and notification capability to be used if the primary ANS becomes unavailable. This information is thus acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.D.3, and conforms to the guidance in NSIR/DPR-ISG-01. Verification that a future revision of the COL application incorporates the applicant's proposed changes in RAI 13.03-99 was tracked as Confirmatory Item 13.03-79. The

staff verified that the proposed changes in the RAI response are included in Part 5 to the COL application Revision 7. Therefore, Confirmatory Item 13.03-79 is resolved.

13.3C.5.7 *Written Messages to the Public*

Technical Information in the Emergency Plan: [E.7] Section II.E of the Fermi 3 Emergency Plan states that the State of Michigan has developed EAS messages for the public that are consistent with the emergency classification scheme. These draft messages are included as part of the State of Michigan EAS Plan and contain instructions with regard to specific protective actions to be taken by occupants and visitors of the affected areas. Detroit Edison will provide offsite authorities with supporting information for messages to the public. Messages may include instructions such as to take shelter and go indoors; close windows and doors; turn off ventilation systems; directions for evacuation; directions to stay tuned to specific stations for further information; ad hoc respiratory protection (for example, handkerchief over mouth or thyroid blocking).

Technical Evaluation: [E.7] The staff finds that the Fermi 3 Emergency Plan adequately discusses written messages intended for the public developed by the State of Michigan. In particular, draft messages were prepared giving instructions to the public with regard to specific protective actions to be taken by occupants of the affected areas. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.5.8 *Notification of the NRC*

Technical Information in the Emergency Plan: {Appendix E, Section IV.A.4} (10 CFR 50.72(a)(3)) and (10 CFR 50.72(c)(3)) Section II.E.1.b.2, “Nuclear Regulatory Commission,” explains that an event will be reported to the NRC Operations Center immediately after notification of the appropriate State and county agencies, but no later than one (1) hour after the initial classification, escalation, termination, or entry into the recovery phase. Section II.F.1.5, "NRC Telephones," describes separate telephone lines dedicated for communications with the NRC, which include the Emergency Notification System (ENS). The ENS provides initial notifications and ongoing information about plant systems, status, and parameters to the NRC. The Emergency Response Data System (ERDS) will be initiated within one (1) hour of the declaration of an Alert classification or higher. In RAI 13.03-34, the staff requested the applicant to add a description to the Fermi 3 Emergency Response Plan of an accelerated notification to the NRC of a security-related attack within approximately 15 minutes of its discovery, as described in RIS 2006-12, “Endorsement of Nuclear Energy Institute Guidance ‘Enhancements to Emergency Preparedness Programs For Hostile Action.” The applicant’s response dated December 7, 2009 (ADAMS Accession No. ML093440828), provided a revision to Section II.El.b.2 of the Fermi 3 Emergency Plan that describes an accelerated notification process within 15 minutes of a security-related attack at the site. Specific requirements for notifications to the NRC for classified emergency events are detailed in 10 CFR 50.72, and guidance is provided in the EPIPs.

Technical Evaluation: {Appendix E, Section IV.A.4} (10 CFR 50.72(a)(3)) The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-34 acceptable because they conform to the requirements in 10 CFR Part 50, Appendix E, Section IV.A.4, and 10 CFR 50.72(a)(3). The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-34. The staff finds that the Fermi 3 Emergency Plan provides adequate details for

notifying the NRC immediately after notifying the appropriate State or local agencies and no later than one hour after the time the licensee declares one of the Emergency Classes, in addition to an abbreviated notification within 15 minutes of a security-related event. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Section IV.A.4, and 10 CFR 50.72(a)(3).

(10 CFR 50.72(c)(3)) The staff finds that the Fermi 3 Emergency Plan adequately describes the telephone notifications under 10 CFR 50.73(a) and (b), in addition to the required initial notification. There are adequate provisions that upon the request of the NRC, an open and continuous communication channel with the NRC will be maintained. This information is acceptable because it conforms to the requirements in 10 CFR 50.72(c)(3).

13.3C.5.9 *Conclusion*

The staff concludes that the information in the Fermi 3 Emergency Plan regarding notification methods and procedures are acceptable, because they conform to and meet the requirements of 10 CFR 50.47(b)(5), 10 CFR 50.72(a)(3), 10 CFR 50.72(c)(3), and Appendix E to 10 CFR Part 50, Sections IV.A.4, IV.C, IV.D.1, and D.3 and the guidance in Planning Standard E of NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.6 Emergency Communications

13.3C.6.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(6), the staff evaluated the plan against the detailed evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the plan against applicable regulatory requirements related to “Emergency Communications” in Appendix E to 10 CFR Part 50 and Generic Letter (GL) 91-14, “Emergency Telecommunications.”

13.3C.6.2 *Content of the Emergency Communications Plan*

Technical Information in the Emergency Plan: [F.1.a] Section II.F.1, “Description of Communications Links,” states that Fermi 3 maintains the capability to make initial notifications to the designated offsite agencies on a 24-hour per day basis. The offsite notification ring-down phone system provides communications to State and county warning points and to EOCs from the CR, TSC, and EOF. Backup methods include commercial telephone lines, radios, and facsimiles. State and county warning points are continuously staffed. Figure II.F-1 depicts the emergency communications telephone network; and Figure II.F-2 depicts the communications links between the Fermi 3 site, Monroe County, Wayne County, and the State of Michigan.

Figure F-2, “Personnel in Charge of Communications Links at Fermi 3, Monroe County, Wayne County, and the State of Michigan,” provides the titles and alternates for those in charge of the communications links. Section II.F.1 states that Fermi 3 maintains the capability of making initial notifications to the designated offsite agencies on a 24-hour per day basis. State and county warning points are continuously staffed and available to receive notification of an event at Fermi 3.

Additional technical details describing the intra- and offsite plant communications are in Section 9.5.2, “Communications Systems,” of this SER.

Technical Evaluation: [F.1.a] The staff finds that the Fermi 3 Emergency Plan adequately addresses communication plans for emergencies provide for 24-hour per day notifications to and activation of the State/local emergency response network. At a minimum, this network provides a telephone link and an alternate that include around-the-clock staffing at communication links that initiate emergency response actions. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Additional technical staff reviews of information regarding emergency communications are in Section 9.5.2 of this SER.

Technical Information in the Emergency Plan: [F.1.b.] Section II.F.1 describes communications systems used between the applicant and State and local governments in the plume exposure pathway EPZ. The communication systems described include telephone communications through: private automatic branch exchange lines, automatic ring-down phones, NRC telephones, a microwave system, JIC phones, and radio communications systems as backup communication options.

Technical Evaluation: [F.1.b] The staff finds that the Fermi 3 Emergency Plan adequately addresses provisions for communications with State and local governments within the EPZs. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [F.1.c.] Section II.F.1 describes communications systems used between the applicant and Federal emergency response organizations. These systems include the PABX lines, the ENS, the Health Physics Network (HPN), the Reactor Safety Counterpart Link (RSCL), the Protective Measures Counterpart Link (PMCL), the ERDS Channel, and the Management Counterpart Link (MCL).

Technical Evaluation: [F.1.c] The staff finds that the Fermi 3 Emergency Plan adequately addresses provisions for communications as needed with Federal EROs. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [F.1.d.] Section II.F.1 describes communications systems used between the CR, TSC, EOF, the nuclear facility, the principal State and local EOCs, and the field assessment teams. These communication systems include PABX lines, a sound-powered telephone system, a ring-down phone system, an automatic callout system, a microwave system, telephones in the JIC, radio communications, facsimile transmissions, the PA/PL system, and the owner-controlled area notification system (OCANS).

Technical Evaluation: [F.1.d] The staff finds that the Fermi 3 Emergency Plan adequately describes the communication plans that include provisions for emergency communications between the nuclear facility and the EOF, State and local EOCs, and radiological monitoring teams. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [F.1.e.] Section II.F.1.a.4, “Automatic Callout System,” describes that notification of onsite personnel will be completed through a combination of public address announcements, alarms, and proceduralized phone calls. Fermi 3 utilizes an automatic callout system that employs pagers as the primary notification method and an automatic telephone system as a backup to rapidly notify members of the ERO. The system

consists of a computer with modem equipment capable of initiating and receiving telephone calls. When contact is made, the system automatically requests security identification and then responds. The pager vendor's system accepts group and individual numbers from the callout system that activate several radio transmitters that, in turn, activate personal pagers assigned to ERO members. The system is designed with redundant power, phone, and computer components with geographic separation.

Technical Evaluation: [F.1.e] The staff finds that the Fermi 3 Emergency Plan adequately describes the emergency communication plans that include provision for alerting or activating emergency personnel in each response organization. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [F.1.f.] Section II.F.1 describes communications systems used between the applicant and NRC Headquarters, the NRC Regional Office Operations Center, the EOF, and the radiological monitoring team assembly areas. These systems include the ENS, HPN, RSCL, PMCL, the ERDS Channel, MCL, local area network (LAN), and the nuclear security system. Offsite RET vehicles are equipped with a radio to provide mobile communications that are carried over Detroit Edison ultra-high frequency (UHF) service frequencies assigned to Western Wayne County. The radio control console for directing actions of the offsite RET is located in the EOF/RET Dispatch Room.

Technical Evaluation: [F.1.f] The staff finds that the Fermi 3 Emergency Plan adequately describes the communication plans for emergencies and addresses provisions for communication by the licensee with NRC headquarters, NRC Regional Office Emergency Operations Centers, and the EOF and radiological monitoring team assembly area. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: {Appendix E, Section IV.E.9} Section II.F.1 describes multiple onsite and offsite communications systems. Communication systems include telephone systems, radio systems, facsimiles, PA/PL, OCANS. Backup power sources exist including, batteries, and standby generators.

Technical Information in the Emergency Plan: {Appendix E, Section IV.E.9(a)}
Section II.F.3, "Communication System Tests," of the Fermi 3 Emergency Plan explains that communications between the Fermi 3 ERFs and the State/county warning points are tested monthly.

Technical Information in the Emergency Plan: {Appendix E, Section IV.E.9(b)}
Section II.N.2.a, "Communication Drills," states that communication systems between the CR, TSC, and EOF to the NRC Headquarters Operations Center shall be tested monthly.

Technical Information in the Emergency Plan: {Appendix E, Section IV.E.9(c)}
Section II.N.2.a states that communications between the plant, State, and local EOCs and offsite RETs are tested annually.

Technical Information in the Emergency Plan: {Appendix E, Section IV.E.9(d)}
Section II.N.2.a states that communication systems between the CR, TSC, EOF, to NRC Headquarters and Regional Operations Center shall be tested monthly.

Technical Evaluation: {Appendix E, Section IV.E.9, (a), (b), (c), and (d)} The staff finds that the Fermi 3 Emergency Plan adequately describes at least one onsite and one offsite communications system and a backup power source for each system. This information is acceptable because it conforms to the requirements described in Appendix E to 10 CFR Part 50.

In addition, the applicant's communication plans have arrangements for emergencies that include titles and alternates for those in charge at both ends of the communication links and primary and backup means of communication. Consistent with the function of the governmental agency, these arrangements include:

a. Provisions for communications with contiguous State/local governments within the plume exposure pathway EPZ. Such communications shall be tested monthly.

b. Provisions for communications with Federal emergency response organizations. Such communications shall be tested annually.

c. Provisions for communications among the nuclear power reactor CR, onsite TSC, and EOF; and among the nuclear facility, the principal State and local emergency operations centers, and the field assessment teams. Such communications shall be tested annually.

d. Provisions for communications between the licensee and NRC Headquarters and the appropriate NRC Regional Office Operations Center from the nuclear power reactor CR, onsite TSC, and EOF. Such communications shall be tested monthly.

These provisions for onsite and offsite communications are acceptable because they meet the requirements in Appendix E to 10 CFR Part 50.

Technical Information in the Emergency Plan: (GL 91-14) Section II.F.1.a.5 of the Fermi 3 Emergency Plan describes that the ENS, HPN, RSCL, PMCL, ERDS, MCL, and the LAN are separate dedicated telephone lines for communications with the NRC. In RAI 13.03-06-01, the staff requested additional information regarding guaranteed power provided to the emergency communications equipment. In the response dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant described the emergency telecommunications system (ETS) and refers to ESBWR DCD Section 9.5.2, and FSAR Subsection 9.5.2.2 regarding the guaranteed power to the communications equipment. The applicant states that ESBWR DCD Subsection 9.5.2.1 provides the following power generation design bases for the plant communications systems:

- Communication subsystems are independent of one another, so a failure in one subsystem does not degrade the performance of the other subsystems.

- The communication system is in accordance with applicable codes and standards, and the equipment is shielded as necessary from the adverse effects of electromagnetic interference (EMI) and radio frequency interference (RFI).

- The communication subsystems are functional during a loss of offsite power.

The applicant stated that FSAR Subsection 9.5.2.2 provides additional details regarding power supplies to the ENS:

Electrical power for this phone system is provided by two redundant AC power sources, and batteries, with an 8 hour capacity rating, would automatically supply power to these phones if a complete loss of AC power to the phones occurred. This design ensures that the ENS located at the site is fully operable from the site in the event of a loss of offsite power at the site and is in compliance with the requirements of NRC Bulletin 80-15 for the ENS.

In Supplemental RAI 13.03-12, the staff requested the applicant to revise Section II.F.1.a.5 of the Emergency Plan to include a reference to the sections of the ESBWR DCD and the FSAR that describe guaranteed power to the communication systems. In the response to Supplemental RAI 13.03-12 dated June 25, 2010 (ADAMS Accession No. ML101790463), the applicant provided revisions to be included in Section F.1 that state, "Subsection 9.5.2.2 of the Fermi 3 FSAR and Subsection 9.5.2 of the ESWBR DCD provide a description of the plant communications systems."

Technical Evaluation: (GL 91-14) The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to Supplemental RAI 13.03-12 acceptable, because they conform to the guidance in GL 91-14. The staff confirmed that Revision 7 of Fermi 3 FSAR Subsection 9.5.2.2 incorporate the additional information and textual revisions in the response to Supplemental RAI 13.03-12. Therefore, the staff finds that the Fermi 3 Emergency Plan adequately includes provisions for communications with the NRC. This information is acceptable because it meets the guidance in GL 91-14.

13.3C.6.3 *Communications with Medical Facilities*

Technical Information in the Emergency Plan: [F.2] Section II.F.2, "Communication with Fixed and Mobile Medical Support Facilities," of the Fermi 3 Emergency Plan states that commercial telephones are the primary communications method to both primary and backup medical hospitals. Backup communications systems include radio or other mobile services. Communication between ambulances and hospitals is the responsibility of the ambulance and hospital services.

Technical Evaluation: [F.2] The staff finds that the Fermi 3 Emergency Plan adequately describes a coordinated communication link for fixed medical support facilities and ambulance services. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.6.4 *Periodic Testing of the Emergency Communications System*

Technical Information in the Emergency Plan: [F.3] Section II.F.3, "Communication System Tests," of the Fermi 3 Emergency Plan states that communications between the Fermi 3 ERFs and the State/county warning points are tested monthly. Section II.N.2.a, "Communication Drills," provides the following additional communication testing schedules:

- Communications between the CR, TSC, EOF, Michigan State Police, Monroe County Central Dispatch, and Wayne County Central Communications are tested monthly.
- Communications between Fermi 3 ERFs and the offsite response organizations are tested during annual drills.
- Communications between plant, State, and local EOCs and offsite RETs are tested

annually.

- Communications between the CR, TSC, OSC, EOF, and Joint Public Information Center (JPIC) are tested annually.

Technical Evaluation: [F.3] The staff finds that the Fermi 3 Emergency Plan adequately describes the periodic testing of the entire emergency communications system. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.6.5 *Conclusion*

NRC staff concludes that the information in the Fermi 3 Emergency Plan regarding emergency communications is acceptable and conforms to the requirements of 10 CFR 50.47(b)(6); Appendix E to 10 CFR Part 50; Sections IV.E.9(a), (b), (c), and (d); the guidance in Planning Standard F of NUREG-0654/FEMA-REP-1, Revision 1; and the guidance in GL 91-14 as described above.

13.3C.7 Public Education and Information

13.3C.7.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(7), the staff evaluated the plan against the detailed evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the plan against applicable regulatory requirements related to "Public Education and Information" in Appendix E to 10 CFR Part 50.

13.3C.7.2 *Content of Public Information*

Technical Information in the Emergency Plan: [G.1] Section II.G, “Public Education and Information,” describes Detroit Edison’s public education and information program and outlines the process for keeping the public within the 16-km (10-mi) EPZ informed in the event of an emergency. Details regarding types of information provided to the public and coordination with the news media are specifically described in the EPIPs. Section II.G.1, “Public Information Program,” states that the public education and information program for the Fermi 3 Plant is updated annually by Detroit Edison—in coordination with State and county agencies—to address how the general public is notified and what the actions affected individuals should take in an emergency. This information includes but is not limited to educational information on radiation; who to contact for additional information; protective measures (shelters, evacuation route maps, reception/congregate care center locations, and respiratory protection information); and special instructions for the handicapped.

Section II.G.2, “Distribution and Maintenance of Public Information,” states that Detroit Edison distributes a safety information publication on an annual basis to residents and transients in the 16-km (10-mi) EPZ. The information is distributed by mail to each residence and to appropriate locations where transient populations may obtain a copy including hotels, highway rest areas, and State recreation areas; and activities such as school program presentations’ speeches at meetings of community groups; booth displays at the Monroe County Fair; and tours of the Fermi 3 plant. These tours include exhibits, lectures, and the opportunity to ask questions about all aspects of plant operations. The public information program provides permanent as well as

transient populations with an adequate opportunity to become aware of the information that is available. Public information materials instruct affected individuals to go indoors and turn on their radios or televisions when they hear the ANS sirens operating. The publications identify which local radio and television stations provide information related to a plant emergency.

Technical Evaluation: [G.1] The staff finds that the Fermi 3 Emergency Plan adequately describes both the periodic (at least annually) dissemination of information to the public regarding how affected areas and populations will be notified and what actions they should take in an emergency and the means for accomplishing the dissemination of the information. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.7.3 *Distribution and Maintenance of Public Information*

Technical Information in the Emergency Plan: [G.2] {Appendix E, Section IV.D.2} Section II.G.2 states that the applicant will update and mail safety information publications annually to residents and to locations where transients may be located including hotels, highway rest areas, and State recreation areas. These materials instruct affected individuals to go indoors and turn on their radios and televisions at the sound of the sirens. Educational information on radiation and which radio and television stations provide information relevant to the event are included in these public education materials.

Technical Evaluation: [G.2] {Appendix E, Section IV.D.2} The staff finds that the Fermi 3 Emergency Plan adequately describes a public information program that annually provides permanent and transient populations within the plume exposure EPZ an adequate opportunity to become aware of the information. The program includes provisions for written materials that are available in a residence during an emergency. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Section IV.D.2 and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.7.4 *Points of Contact for the News Media*

Technical Information in the Emergency Plan: [G.3.a] Section II.G.3, “News Media Coordination,” identifies the location of the JIC at the Monroe County Community College, 19.2 km (12 mi) west-southwest of Fermi 3, with an Onsite News Center briefing area for the media when appropriate. The Onsite News Center is located in the Nuclear Operations Center (NOC) Auditorium, approximately one mile southwest of the plant. Section II.G.4, “Information Exchange,” identifies a Company officer as the designated Corporate Utility Spokesperson for the applicant in the event of an accident at Fermi 3. This Utility Spokesperson will brief the news media in the Onsite News Center during non-radiological releases. If the JIC is activated, the Utility Spokesperson and JIC staff will coordinate with the EOF; Corporate Communication personnel; and Federal, State, county, and Canadian spokespersons in the JIC. According to Section II.G.3, the JIC is located 19.2 km (12 mi) west-southwest of Fermi 3 at the Monroe County Community College and can accommodate approximately 500 members of the news media. In RAI 13.03-07.01, the staff requested the applicant to provide the news media contacts. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant stated that Section II.G of the Emergency Plan describes multiple activities that address interactions with the news media, including the publication and distribution of public educational information that discusses public information sources and an annual News Media Acquaintance Program. The applicant further stated that carrying out these

activities requires the identification of and coordination with the news media consistent with the controlling regulatory requirements and guidance. The applicant provided a copy of the current public emergency information publication that includes a listing of EAS radio and television stations and stated that Fermi 2 and 3 will use a common public emergency information publication similar to the one currently used by Fermi 2. Section II.G states that details regarding the types of information provided to the public and coordination with the news media are in the EPIPs.

Technical Evaluation: [G.3.a] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-07.01 acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1**.** The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the additional information and textual revisions in the response to RAI 13.03-07.01. The staff finds that the Fermi 3 Emergency Plan adequately designates the points of contact and physical locations for use by the news media during an emergency. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.7.5 *Space for News Media*

Technical Information in the Emergency Plan: [G.3.b] Section II.G.3 identifies the location of the JIC at the Monroe County Community College. The JIC can accommodate approximately 500 members of the news media, and an Onsite News Center that serves as a briefing area for the media (when appropriate) can accommodate 20 to 50 news media personnel.

Technical Evaluation: [G.3.b] The staff finds that the Fermi 3 Emergency Plan adequately describes the physical location of the space designated for use by a limited number of news media at the EOF during a declared emergency at the Fermi 3 site. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.7.6 *Designated Spokesperson*

Technical Information in the Emergency Plan: [G.4.a] Section II.G.4 of the Fermi 3 Emergency Plan states that a Company officer will be designated Corporate Utility spokesperson for an event at Fermi 3. In RAI 13.03-07.03, the staff requested additional information regarding designated spokespersons. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant explains that the designated Federal, State, local, and Canadian spokespersons are specified in their respective plans and Section II.G.4 describes the process for the Corporate Utility Spokesperson and other designated spokespersons to obtain access to and execute a timely exchange of all necessary information.

Technical Evaluation: [G.4.a] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-07.03 acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan the additional information and textual revisions provided in the response to RAI 13.03-07.03. The staff finds that the Fermi 3 Emergency Plan adequately identifies a spokesperson who has access to all necessary information. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.7.7 *Timely Exchange of Information*

Technical Information in the Emergency Plan: [G.4.b] Section II.G.4 states that there will be a timely exchange of information between spokespersons. In RAI 13.03-07.04, the staff requested additional information regarding descriptions by title/position of the plant's points of contacts for releasing public information. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant identified news media training to include information regarding points of contact for releasing public information during an emergency.

Technical Evaluation: [G.4.b] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-07.04 acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan the additional information and textual revisions provided in the response to RAI 13.03-07.04. The staff finds that the Fermi 3 Emergency Plan adequately describes the established arrangements for a timely exchange of information among designated spokespersons. This information is acceptable because it meets the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.7.8 *Rumor Control*

Technical Information in the Emergency Plan: [G.4.c] Section II.G.4 addresses rumors. If members of the public need to obtain information, they can request a clarification of any questions they may have by calling a publicized number for the Monroe County Emergency Management Division (EMD). Telephones at the Monroe County EMD will be staffed by local government representatives. Utility personnel at the JIC will coordinate rumor control with personnel at the Monroe County EMD before media briefings, so that rumors can be refuted or confirmed. This communication with the public will aid in dispelling rumors. Annex D to Appendix I, "Nuclear Accident Procedures Public Information," of the Monroe County Emergency Management Plan states that Public Inquiry Personnel will staff phones, but an automatic answering service may be utilized. Section II.G.4 states that State and local plans and procedures have been established and provide further details concerning the control of rumors.

Technical Evaluation: [G.4.c] The staff finds that the Fermi 3 Emergency Plan adequately describes the coordinated arrangements for dealing with rumors. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.7.9 *Annual Media Orientation*

Technical Information in the Emergency Plan: [G.5] Section II.G.5, "News Media Training," states that the applicant, with the assistance of State and local authorities, will conduct programs annually to acquaint the news media with Emergency Plan and procedures. These programs cover radiation and radiological effects of nuclear power plants and provide information regarding points of contact for releasing information under emergency conditions. These programs also offer information to enhance the media's ability to communicate radiological events to the public.

Technical Evaluation: [G.5] The staff finds that the Fermi 3 Emergency Plan adequately describes a coordinated program that is conducted at least annually to acquaint the news media with the emergency plans, information concerning radiation, and points of contact for releasing

public information in an emergency. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.7.10 *Conclusion*

NRC staff concludes that the information in the Fermi 3 Emergency Plan regarding public education and information is acceptable because it meets the requirements of 10 CFR 50.47(b)(7), Appendix E to 10 CFR Part 50, and Section IV.D.2 and conforms to the guidance in Planning Standard G of NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.8 Emergency Facilities and Equipment

13.3C.8.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(8), the staff evaluated the plan against the detailed evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the plan against applicable regulatory requirements related to "Emergency Facilities and Equipment," in Appendix E to 10 CFR Part 50, 10 CFR 50.34, and 10 CFR 50.72. In addition, the staff evaluated the proposed emergency plan against the guidance in Supplement 1 to NUREG-0737.

Technical Support Center

13.3C.8.2 *Technical Support Center Functions*

Technical Information in the Emergency Plan: [H.1] {Appendix E, Section IV.E.8} (8.2.1.a of NUREG-0737, Supplement 1) Section II.H.1.b, "Technical Support Center," states that the TSC is activated for Alert and higher emergencies and provides support to the CR for plant status assessments, potential offsite impacts, and emergency action implementation. The TSC is able to accommodate 26 people, including 21 Detroit Edison personnel and workspace for five NRC representatives. The TSC provides plant management and technical support to the CR staff, relieves RO of peripheral duties not directly related to reactor system manipulations, provides continuing event classification evaluation, emergency response coordination within the Protected Area, and may be used for technical support during recovery operations. The TSC staff provides protective actions onsite and offsite and communication with government agencies until the EOF is operational. Section II.B of the Fermi 3 Emergency Plan provides a description of the TSC technical, engineering, senior management and other position staffing.

Technical Evaluation: [H.1] {Appendix E, Section IV.E.8} (8.2.1.a) The staff finds that the Fermi 3 Emergency Plan adequately describes the TSC staffing and ability to effectively direct and control necessary emergency actions during an event. This information is acceptable because it conforms to the requirements of Appendix E to 10 CFR Part 50, Section IV.E, the guidance in NUREG-0654/FEMA-REP-1, Revision 1, and Supplement 1 to NUREG-0737.

13.3C.8.3 *TSC Location*

Technical Information in the Emergency Plan: (8.2.1.b of NUREG-0737, Supplement 1) (50.34(f)(2)(xxv)) Section H.1.b identifies the location of the TSCs in the electrical building within the Protected Area; they meet all of the ESBWR Standard Plant TSC design requirements.

Technical Evaluation: (8.2.1.b of NUREG-0737, Supplement 1) (50.34(f)(2)(xxv)) The staff finds that the Fermi 3 Emergency Plan adequately describes the TSC location. This information is acceptable because it meets the requirements in 10 CFR 50.34(f)(2)(xxv) and the guidance in Supplement 1 to NUREG-0737, Section 8.2.1.b.

13.3C.8.4 *TSC Staffing Requirements*

Technical Information in the Emergency Plan: (8.2.1.c and j of NUREG–-0737, Supplement 1) Table II.B-1, "Minimum Staffing Requirements for Emergencies," lists the TSC staffing within 30 minutes of a declared emergency. The list includes the Emergency Director, Communicator, and the Radiation Protection Advisor. Within 60 minutes, the list also includes the Technical Engineer or Nuclear Safety Advisor and the Support Engineer. In RAI 13.03-08.02, the staff requested additional information regarding how the TSC staffing meets the requirements in NUREG-0737, Supplement 1. The RAI is particularly concerned about core/thermal hydraulics and electrical and mechanical technical support. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant included a revised Table II.B-1, which identified core/thermal hydraulics and electrical and mechanical engineering analyses as the technical support provided by on-shift personnel. In RAI 13.03-02-09, the staff requested additional information on why Table II.B-1 did not describe core/thermal hydraulics, maintenance expertise for electrical, I&C, and Mechanical and Radwaste Operator expertise, or individuals to fill these functions. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828) stated that the staffing identified in Table II.B-1 is based on enhancements gained after years of experience from operating the existing Fermi 2, and the effectiveness of the proposed emergency response organizational staffing has been tested and proven through the organization's response to multiple drills, exercises, and emergency events. The staff requested additional information in Supplemental RAI 13.03-09 regarding the enhancements resulting from experience that demonstrates the proposed reduced staffing represents sufficient staffing and expertise. In the response to Supplemental RAI 13.03-09 dated June 25, 2010 (ADAMS Accession No. ML101790463), the applicant referred the staff to the Table II.B-1 revision included in the response to RAI 13.03-02-12 dated December 7, 2009 (ADAMS Accession No. ML093440828), which shows that Detroit Edison Maintenance personnel are assigned to the Damage Control and Rescue Team. The staff found that a revision to Table II.B-1 was included in the response to RAI 13.03-02-09 and not in the response to RAI 13.03-02-12. The applicant further stated that as indicated in FSAR Table 13.1-202, the Radwaste Operator is not a member of the minimum shift organization for the ESBWR. The applicant stated that Non-Licensed Operators are qualified to perform radwaste operations during emergencies. The applicant also states that a footnote to Table II.B-1 will be added to clarify that one Non-Licensed Operator may be assigned Radwaste Operator duties to support the emergency response or recovery activities, as needed. The applicant provided a revised Table II.B-1 with a footnote explaining that one Non-Licensed Operator may be assigned Radwaste Operator duties.

In RAI 13.03-08.03, the staff requested additional information regarding how TSC staffing meets the NUREG-0696 requirement of full and functional operation within 30 minutes. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), states that the staffing identified in Table II.B-1 is based on NUREG-0654/FEMA-REP-1, Revision 1 and Revisions 2 and 3 of RG 1.101. The applicant added that similar staffing designations used for the existing Fermi 2 have successfully responded to drills, exercises, and emergency events.

Technical Evaluation: (8.2.1.c and j of NUREG-0737, Supplement 1) The staff finds the additional information and textual revisions to the Fermi 3 Emergency Plan submitted in responses to RAIs 13.03-08.03, 13.03-02-09, and Supplemental RAI 13.03-09 acceptable because they conform to the guidance in Supplement 1 to NUREG-0737, Sections 8.2.1.c and j. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan the additional information and textual revisions provided in the response to RAI 13.03-08.03, 13.03-02-09 and Supplemental RAI 13.03-09. The staff finds that the Fermi 3 Emergency Plan adequately describes the TSC staffing, size, and equipment.

13.3C.8.5 *TSC Structure*

Technical Information in the Emergency Plan: (8.2.1.d of NUREG–0737, Supplement 1) Section II.H.1.b states that the TSC design is in accordance with the ESBWR Standard Plant that complies with all TSC requirements. The applicant has incorporated the TSC structure described in the ESBWR DCD with no departures or deviations and states that the ESBWR DCD provides relevant information regarding the design and location of the TSC. Table 3.2-1, "Classification Summary," of the ESBWR DCD Tier 2 states that the electrical building structure is Seismic Category NS. Section 3.2.1, "Seismic Classification," of the ESBWR DCD Tier 2 states that the Seismic Category NS structures and equipment are designed for seismic requirements that are in accordance with the 2003 revision of the International Building Code (IBC).

Technical Evaluation: (8.2.1.d of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the TSC structure. This information is acceptable because it meets the guidance in Supplement 1 to NUREG–0737, Section 8.2.1.d.

13.3C.8.6 *TSC Environmental Controls*

Technical Information in the Emergency Plan: (8.2.1.e of NUREG–0737, Supplement 1) Section II.H.1.b states that the TSC has environmental controls for providing room temperature, air, humidity, and cleanliness appropriate for personnel and equipment. Section 9.4.7, "Electrical Building HVAC System," of the ESBWR DCD Tier 2 states that the electrical building heating, ventilation, and air conditioning (HVAC) has a subsystem for the TSC, the TSC HVAC subsystem (TSCVS), and while the TSC ventilation system is not specified in SRP Section 9.4.1, the ESBWR design is committed to providing a TSC that has environmental conditions in the TSC compatible with the design limits of its equipment. The TSCVS provides filtered conditioned air to the TSC using two redundant air filtration units (AFUs) with fans, high efficiency particulate air (HEPA) filters, charcoal filters for radioactive material removal when needed. The TSCVS maintains the TSC at a slight, positive pressure. Redundant air handling units with filters, heating and cooling coils, and a humidifier provide conditioned air to the TSC.

Technical Evaluation: (8.2.1.e of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the TSC environmental controls. This information is acceptable because it meets the guidance in Supplement 1 to NUREG–0737, Section 8.2.1.e.

13.3C.8.7 *TSC Radiological Protection*

Technical Information in the Emergency Plan: (8.2.1.f of NUREG–0737, Supplement 1) Section II.H.1.b states that the TSC room is equipped with radiological protection and

monitoring for personnel radiation exposure to maintain doses of less than 0.05 Sieverts (Sv) (5 roentgen equivalent man [rem]) total effective dose equivalent (TEDE) as defined in 10 CFR 50.2 for the duration of the accident, and the level of protection is similar to that of the CR. Subsection 11.5.1.1.2, "Radiation Monitors Required for Plant Operation," of the ESBWR DCD Tier 2 states that the Process Radiation Monitoring system includes monitoring of the gaseous intake stream for the TSCVS air intake. Subsection 11.5.3.2.12, "Technical Support Center HVAC Air Intake," of the ESBWR DCD Tier 2 states that this system continuously monitors the intake air duct with a single gamma radiation monitor.

Subsection 7.5.2.2, "Containment Monitoring System," of DCD Tier 2, describes the containment monitoring system for gaseous sampling and effluent radiation monitoring and the parameters that are monitored during normal and accident conditions.

{Appendix E, Section IV.E.1} Section II.H.1.b states that the TSC is equipped with radiological protection and monitoring for personnel radiation exposure to maintain doses of less than 0.05 Sv (5 rem) TEDE for the duration of the accident, and the level of protection is similar to that of the CR.

Technical Evaluation: (8.2.1.f of NUREG–0737, Supplement 1) {Appendix E, Section IV.E.1} The staff finds that the Fermi 3 Emergency Plan adequately describes the TSC radiological protection. This information is acceptable because it meets the requirements of 10 CFR Part 50, Appendix E, Section IV.E.1 and the guidance in Supplement 1 to NUREG-0737, Section 8.2.1.f.

Subsection 15.4.5.3.2.5, "Technical Support Center Radiological Consequence Analysis," of the NUREG–1966 (ESBWR DCD FSER) contains additional evaluation details concerning the habitability of the TSC and concludes that the analysis of the TSC radiological consequence in the ESBWR DCD, which is incorporated by reference into the Fermi 3 COL FSAR, is acceptable.

13.3C.8.8 *TSC Communications*

Technical Information in the Emergency Plan: (8.2.1.g of NUREG–0737, Supplement 1) Section II.H.1.b states that the TSC has reliable voice and data communications to the CR, OSC, EOF, NRC Operations Center, and other offsite agencies. Section II.F.1 describes the communications available in the TSC. The PABX system connects the CR, TSC, OSC, and EOF. A microwave system provides primary functions for emergency telephones and backup emergency telephone communications using administrative lines that can access offsite locations. A ring-down phone system that is programmed for automatic dialing provides communications to state and county warning points and EOCs from the CR, TSC, and EOF. In addition, facsimile machines are available in the CR, TSC, EOF and JIC. A PA/PL system with handsets and speakers is also available in the TSC.

Technical Evaluation: (8.2.1.g of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the TSC communications. This information is acceptable because it meets the guidance in Supplement 1 to NUREG–0737, Section 8.2.1.g.

13.3C.8.9 *TSC Data Collection, Storage, and Analysis*

Technical Information in the Emergency Plan: (8.2.1.h of NUREG–0737, Supplement 1) Section II.H.1.b states that the TSC has the capability to record and display vital plant data in real time, and the display capability includes a workstation capable of displaying the parameters required for a safety parameter display system (SPDS). Section 7.1.5 of the ESBWR DCD Tier 2 describes the SPDS. Subsection 7.1.5.1.2, "N-DCIS [Nonsafety-related distributed control and information system] Non safety-Related Design Bases," of the ESBWR DCD Tier 2 states N-DCIS collects and archives data for display on the SPDS. Section II.H.4, "Onsite Monitoring Systems," also states that key radiological monitoring system (RMS) data are linked to the plant computer that is available in the TSC and EOF. The RMS provides the needed radiation and activity levels to determine source terms for dose projection procedures.

Chapter 7, "Instrumentation and Control Systems," of the ESBWR DCD describes additional technical details relating to the TSC data collection, storage, and analytical capabilities.

Technical Evaluation: (8.2.1.h of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the TSC data collection, storage, and analytical capabilities. This information is acceptable because it meets the guidance in Supplement 1 to NUREG–0737, Section 8.2.1.h.

13.3C.8.10 *TSC Human Factors Engineering*

Technical Information in the Emergency Plan: (8.2.1.h and k of NUREG–0737, Supplement 1) Section 18.1, "Human Factors Engineering, Overview," of the ESBWR DCD Tier 2 states that the human factors engineering (HFE) program addresses the main CR, remote shutdown system, TSC, EOF displays, and local control stations that have safety-related functions or are defined by a task analysis. Section 18.2.1, "HFE Program and MMIS [man-machine interface system] and HFE Implementation Plan," states that the HFE design team will establish the HFE Program and the MMIS and HFE Implementation Plan, which provides the direction and integration of HFE-related design implementation and evaluation activities. Additional details about the HFE Plan and its implementation are described in detail in Chapter 18 of the ESBWR DCD Tier 2.

13.3C.8.11 *TSC Plant Records*

Technical Information in the Emergency Plan: (8.2.1.i of NUREG–0737, Supplement 1) Section II.H.1.b states that TSC personnel have access to up-to-date as-built drawings, schematics, and diagrams of structures and systems to the component level, technical specifications, plant and emergency operating procedures, onsite and offsite emergency plans, offsite population data, evacuation plans, EPIPs, and the FSAR. In RAI 13.03-08.04, the staff requested additional information clarifying whether plant operating records are included in the records available to TSC personnel. In the response dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant states that the TSC staff has access to plant operating records.

Technical Evaluation: (8.2.1.i of NUREG–0737, Supplement 1) The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-08.04 acceptable because they conform to the guidance in Supplement 1 to NUREG-0737, Section 8.2.1.i. The staff confirmed that Revision 4 of the Fermi 3 Emergency

Plan incorporated the additional information and textual revision in the response to RAI 13.03-0804. The staff finds that the Fermi 3 Emergency Plan adequately describes the availability of the TSC plant records. This information is acceptable because it meets the guidance in Supplement 1 to NUREG-0737, Section 8.2.1.i.

13.3C.8.12 *TSC Activation*

Technical Information in the Emergency Plan: [H.4] Section II.H.3, "Activation and Staffing of Emergency Response Facilities (ERFs)," states that the TSC is staffed and activated for Alert and higher declarations. The TSC is staffed and activated using the EPIPs and Table II.B-1 position staffing and times.

Technical Evaluation: [H.4] The staff finds that the Fermi 3 Emergency Plan adequately provides for the activation and staffing of the TSC. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

Operations Support Center

13.3C.8.13 *Operations Support Center Functions*

Technical Information in the Emergency Plan: [H.1] (8.3.1.a of NUREG–0737, Supplement 1) Section II.H.1.c, "Operational Support Center (OSC)," states that the OSC provides an area for the coordination of shift personnel supporting emergency response operations without causing congestion in the CR. The OSC is not designed to be habitable under all emergency conditions, and the EPIPs have provisions for relocating the OSC as needed and as directed by the Emergency Director. The survey, repair, and operations teams are sent from the OSC into the plant areas; the OSC is the staging area for personnel who may be assigned to first aid, search and rescue, damage control, and emergency repair activities.

Technical Evaluation: [H.1] (8.3.1.a of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the OSC functions. This information is acceptable because it meets the guidance in Supplement 1 to NUREG–0737, Section 8.3.1.a and NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.8.14 *OSC Location*

Technical Information in the Emergency Plan: (8.3.1.b of NUREG–0737, Supplement 1) (50.34(f)(2)(xxv)) Section II.H.1.c describes the location of the OSC in the service building within the Protected Area, which is separate from the CR and provides an area for coordinating shift personnel to support emergency response operations without causing congestion in the CR.

Technical Evaluation: (8.3.1.b of NUREG–0737, Supplement 1) (50.34(f)(2)(xxv)) The staff finds that the Fermi 3 Emergency Plan adequately describes the location of the OSC. This information is acceptable because it conforms to the requirements of 10 CFR 50.34(f)(2)(xxv) and the guidance in Supplement 1 to NUREG–0737, Section 8.3.1.b.

13.3C.8.15 *OSC Coordination Activities*

Technical Information in the Emergency Plan: (8.3.1.a of NUREG–0737, Supplement 1) Section II.H.1.c describes the OSC as an area for coordinating shift personnel supporting emergency response operations without causing congestion in the CR. The OSC is the staging area for personnel who may be assigned to first aid, search and rescue, damage control, and emergency repair activities. Survey, repair, and operation teams are sent from the OSC into the plant areas. The OSC Coordinator manages OSC activities and dispatches emergency personnel to assignments as directed by the Emergency Director. Operating personnel (not assigned to the CR); Radiation Protection personnel; Chemistry personnel; and Maintenance personnel including mechanical, electrical, and I&C are some of the disciplines that report to the OSC. Responsibilities of the OSC Coordinator also include accountability for anyone dispatched to the OSC and the control of radiological exposure to personnel in the OSC and TSC.

Technical Evaluation: (8.3.1.a of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the functions of the OSC Coordination Activities. This information is acceptable because it conforms to the guidance in Supplement 1 to NUREG–0737, Section 8.3.1.a.

13.3C.8.16 *OSC Communications*

Technical Information in the Emergency Plan: (8.3.1.c of NUREG–0737, Supplement 1) Section II.H.1.c explains that the OSC communications system shall have at least one dedicated telephone line to the CR, one dedicated telephone line to the TSC, and a telephone line that can reach onsite and offsite, as a minimum requirement. Section II.F.1 states that the OSC communications system shall have at least one dedicated telephone extension to the CR, one dedicated telephone extension to the TSC, and one telephone capable of reaching onsite and offsite locations, as a minimum requirement. Section II.F of the Emergency Plan provides additional information about the onsite communications systems.

Technical Evaluation: (8.3.1.c of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the OSC communications. This information is acceptable because it meets the guidance in Supplement 1 to NUREG–0737, Section 8.3.1.c.

13.3C.8.17 *OSC Activation and Staffing*

Technical Information in the Emergency Plan: [H.4] Section II.H.3 states the OSC is staffed and activated for Alert and higher declarations. The OSC is staffed and activated using EPIPs and Table II.B-1 position staffing and times.

Technical Evaluation: [H.4] The staff finds that the Fermi 3 Emergency Plan adequately provides for the activation and staffing of the OSC. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.8.18 *OSC Capacity and Supplies*

Technical Information in the Emergency Plan: [H.9] Section II.H.1.c states that the OSC provides an area for coordinating shift personnel supporting emergency response operations,

without causing congestion in the CR. OSC equipment and supplies include protective clothing, dosimetry, and sampling and survey equipment that the OSC teams use.

Technical Evaluation: [H.9] The staff finds that the Fermi 3 Emergency Plan adequately describes the OSC capacity and supplies. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

Emergency Operations Facility

13.3C.8.19 *Emergency Operations Facility Functions*

Technical Information in the Emergency Plan: [H.2] {Appendix E, Section IV.E.8} (8.4.1.a of NUREG–0737, Supplement 1) Section II.H.1.d, "Emergency Operations Facility (EOF)," states that Fermi 2 and 3 share the EOF, which is the location where the Emergency Officer will direct staff in overall company activities involved with an emergency. The EOF is activated upon declarations of the Alert level and higher and provides for overall management of the emergency response; the performance of non-delegable functions when in command and control; offsite protective actions and radiological monitoring; environmental sampling analyses; public information; communications to State and county officials; the determination of recommended public protective actions; and the coordination of Federal, State, and county agencies. The EOF has the capability to display technical data via a workstation that, at a minimum, is capable of displaying the parameters that are required of a SPDS. The SPDS function is described in Section 7.1.5 of the ESBWR DCD Tier 2. The EOF technical data system receives, stores, processes, and displays information sufficient to perform assessments of the actual and potential onsite and offsite environmental consequences of an emergency condition. In RAI 13.03-101, the staff requested additional information as to whether the space available in the EOF was evaluated for an event (such as a security event) that would activate both the Fermi 2 and 3 EROs, to ensure that there is sufficient space to accommodate the additional personnel required by both EROs. The staff requested the applicant to provide documentation for the EOF's available space evaluation and to revise the emergency plan EOF description to include the capability of supporting both Fermi 2 and 3 ERO teams in a site event that activates the EROs for both units. In the applicant's response to a letter dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant provided an adequate description of the evaluation that was performed to demonstrate that the EOF would have adequate space to support the activation and staffing of both the Fermi 2 and 3 EROs.

Technical Evaluation: [H.2] {Appendix E, Section IV.E.8} (8.4.1.a) The staff finds that the additional information submitted in the response to RAI 13.03-101 is acceptable because it conforms to the guidance in NSIR/DPR-ISG-01, Section IV.D. The staff also finds that the Fermi 3 Emergency Plan adequately describes the EOF functions. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Section IV.E.8 and the guidance in NUREG-0654/FEMA-REP-1, Revision 1, NSIR/DPR-ISG-01 and Supplement 1 to NUREG-0737, Section 8.4.1.a. Verification that a future revision of the COL application incorporates the applicant's proposed changes in RAI 13.03-101 was tracked as Confirmatory Item 13.03-80. The staff verified that the proposed changes in the RAI response are included in Part 5 and Part 10 to the COL application Revision 7. Therefore, Confirmatory Item 13.03-80 is resolved.

13.3C.8.20 *EOF Location*

Technical Information in the Emergency Plan: (8.4.1.b of NUREG–0737, Supplement 1) (50.34(f)(2)(xxv)) Section II.H.1.d describes the EOF as about 1,524 meters (m) (5,000 feet [ft]) from Fermi 3 on owner-controlled property. The EOF is designed for habitability in the event of a postulated accidental radioactive release from Fermi 3. The design includes shielding (with a protection factor of 20), an HVAC system with HEPA filters, and portable airborne radioactivity and area radiation monitors that alarm locally to assure that personnel exposures to radiological hazards do not exceed 10 CFR Part 20 limits. The staff requested additional information in RAI 13.03-08.08 regarding the location of the EOF in Figure I-3. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant states that the EOF is located approximately 1,829 m (6,000 ft) southwest of Fermi 2 and approximately 1,524 m (5,000 ft) southwest of the Fermi 3 reactor building. In RAI 13.03-08.07, the staff requested additional information regarding whether the EOF should be included within the owner-controlled area in Figures I-3 and II.J-1. The applicant's response dated December 7, 2009, states that the EOF is located in the NOC, which is located on "owner-controlled property" but is not within the owner-controlled area.

Technical Evaluation: (8.4.1 of NUREG–0737, Supplement 1b) (50.34(f)(2)(xxv)) The staff finds the additional information and textual revisions to the Fermi 3 Emergency Plan submitted in responses to RAIs 13.03-08.07 and 13.03-08.08 acceptable, because they conform to the guidance in Supplement 1 to NUREG–0737, Section 8.4.1.b. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the additional information and textual revisions in the responses to RAIs 13.03-08.07 and 13.03-08.08. The staff finds that the Fermi 3 Emergency Plan adequately describes the EOF location. This information is acceptable because it conforms to the requirements in 10 CFR 50.34(f)(2)(xxv) and the guidance in Supplement 1 to NUREG–0737, Section 8.4.1.b.

13.3C.8.21 *EOF Size*

Technical Information in the Emergency Plan: (8.4.1.c of NUREG–0737, Supplement 1) Section II.H.1.d states that the size of the EOF is intended to serve as a workspace that accommodates about 40 people, including 25 Detroit Edison personnel and nine NRC representatives. The EOF also has available workspace for representatives from offsite government agencies including the State of Michigan, Monroe and Wayne Counties, and the Province of Ontario, who may send representatives if they deem it necessary. In RAI 13.03-08.06, the staff requested additional information regarding how the minimum size of 244 square meters (m^2) (2,625 square feet [ft^2]) for the EOF meets NUREG-0696 parameters for 40 persons. In the response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant stated that the description of the EOF floor area in Section II.H.1.d, is inaccurate; the floor area exceeds 279 m^2 (3,000 ft^2) and thus meets the NUREG–0696 criterion.

Technical Evaluation: (8.4.1.c of NUREG–0737, Supplement 1) The staff finds the additional information and textual revisions to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-08.06 acceptable, because they conform to the guidance in Supplement 1 to NUREG-0737, Section 8.2.1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan the additional information and textual revisions provided in the response to RAI 13.03-08.06. The staff finds that the Fermi 3 Emergency Plan adequately describes the

size of the EOF. This information is acceptable because it conforms to the guidance in Supplement 1 to NUREG-0737, Section 8.2.1.

13.3C.8.22 *EOF Structural Capabilities*

Technical Information in the Emergency Plan: (8.4.1.d of NUREG–0737, Supplement 1) In SRP Section 13.3.III, "Review Procedure," Item 9 states that if an application is for an additional reactor at an operating reactor site, and the application proposes to incorporate and extend elements of the existing emergency planning program to the new reactor, those existing elements should be considered acceptable and adequate. Therefore, the building code of the EOF is acceptable because it incorporates elements of the existing emergency plan for Fermi 2.

Technical Evaluation: (8.4.1.d of NUREG–0737, Supplement 1) The staff finds the Fermi 3 Emergency Plan adequately describes the EOF structural capabilities. This information is acceptable because it conforms to the guidance in Supplement 1 to NUREG-0737, Section 8.4.1.d.

13.3C.8.23 *EOF Environmental Requirements*

Technical Information in the Emergency Plan: (8.4.1.e of NUREG–0737, Supplement 1) Section II.H.1.d states that the EOF design is intended to accommodate habitability in the event of a postulated radioactive release from an accident. The design includes shielding with a protection factor of 20, an HVAC with HEPA filters, and portable airborne radioactivity and area radiation monitors that alarm locally to ensure that personnel exposures do not exceed the 10 CFR Part 20 radiation limits.

Technical Evaluation: (8.4.1.e of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the environmental habitability of the EOF. This information is acceptable because it conforms to the guidance in Supplement 1 to NUREG-0737, Section 8.4.1.e.

13.3C.8.24 *EOF Voice and Data Communications and Information Collection*

Technical Information in the Emergency Plan: (8.4.1.f of NUREG–0737, Supplement 1) Section II.H.1.d states that the EOF has extensive communications extending to the TSC, offsite Radiological Teams, the NRC, offsite EOCs, and intra-facilities. Section II.F.1 describes these communications systems that also include facsimiles, computer transmissions, and electronic transfer capabilities, in addition to several radio networks that support communications with radiological monitoring teams, maintenance teams, Nuclear Security personnel, and others and provide backup to offsite government and support agencies. Each offsite RET vehicle has a radio with the radio control console for directing their actions; the radio is located in the EOF/RET Dispatch Room. If telephones are not operative, the EOF Security Advisor has direct radio contact with the Michigan State Police or the Monroe County Sheriff, in addition to the telephone-to-radio capability of the Nuclear Security System.

Section II.H.1.d states that the EOF has backup power capabilities to normal commercial power, so a loss of commercial power is not expected to impact the communications equipment. The backup power sources include an electrical generator, uninterruptible power supply (UPS) systems, and a direct current battery.

Technical Evaluation: (8.4.1.f of NUREG–0737, Supplement 1) The staff finds the Fermi 3 Emergency Plan adequately describes the EOF voice and data communications and information collection capabilities. This information is acceptable because it conforms to the guidance in Supplement 1 to NUREG-0737, Section 8.4.1.f.

13.3C.8.25 *EOF Information Storage and Analysis*

Technical Information in the Emergency Plan: (8.4.1.g of NUREG–0737, Supplement 1) Section II.H.1.d states that the display capability in the EOF includes a workstation that is capable of displaying the parameters required for an SPDS. Section II.H.1.d also states that the EOF technical data system receives, stores, processes, and displays information that is sufficient for assessing actual and potential onsite and offsite environmental consequences of an emergency. Section II.H.4, "Onsite Monitoring Systems," states that the SPDS provides a display of plant parameters that may be used to assess the operation status in the CR, TSC, and EOF; to promote the exchange of information between these facilities; and to assist in the decision making process. Subsection 7.1.5.1.2 of the ESBWR DCD Tier 2 states that this system collects and archives data to display the SPDS in the main CR.

Technical Evaluation: (8.4.1.g of NUREG–0737, Supplement 1) The staff finds the Fermi 3 Emergency Plan adequately describes the EOF information storage and analytical capabilities. This information is acceptable because it conforms to the guidance in Supplement 1 to NUREG-0737, Section 8.4.1.g.

13.3C.8.26 *EOF Plant Records*

Technical Information in the Emergency Plan: (8.4.1.h of NUREG–0737, Supplement 1) Section II.H.1.d states that EOF personnel have access to up-to-date as-built drawings, schematics, and diagrams of structures and systems to the component level; technical specifications; plant and emergency operating procedures, FSAR, state and local emergency management plan, offsite population data, evacuation plans, and EPIPs either as hard copies or electronically.

Technical Evaluation: (8.4.1.h of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan adequately describes the availability of plant records in the EOF. This information is acceptable because it conforms to the guidance in Supplement 1 to NUREG-0737, Section 8.4.1.h.

13.3C.8.27 *EOF Industrial Security*

Technical Information in the Emergency Plan: (8.4.1.j of NUREG–0737, Supplement 1) In SRP Section 13.3.III, "Review Procedure," Item 9 states that if an application is for an additional reactor at an operating reactor site, and the application proposes to incorporate and extend elements of the existing emergency planning program to the new reactor, those existing elements should be considered acceptable and adequate. Therefore, the industrial security provided for the EOF is acceptable because it incorporates elements of the existing emergency plan for Fermi 2.

Technical Evaluation: (8.4.1.j of NUREG–0737, Supplement 1) The staff finds the Fermi 3 Emergency Plan adequately describes the industrial security provided for the EOF. This information is acceptable because it conforms to the guidance in Supplement 1 to NUREG-0737, Section 8.4.1.j.

13.3C.8.28 *EOF Human Factors*

Technical Information in the Emergency Plan: (8.4.1.k of NUREG–0737, Supplement 1) Section 18.1 of the ESBWR DCD Tier 2 states that the HFE programs address the main control room, remote shutdown system, TSC, EOF displays, and Local Control Stations that have safety-related functions or are defined by task analyses. Section 18.2.1 states that the HFE design team will establish the HFE Program and the MMIS and HFE Implementation Plan, which provide the direction and integration of HFE-related design implementation and evaluation activities. Additional details of the HFE Plan and its implementation are described in detail in Chapter 18 of the ESBWR DCD Tier 2.

Technical Evaluation: (8.4.1.k of NUREG–0737, Supplement 1) The staff finds that the Fermi 3 Emergency Plan and Chapter 18 of the ESBWR DCD Tier 2 EOF HFE, to adequately describe the EOF HFE functions. This information is acceptable because it meets the guidance in Supplement 1 to NUREG-0737, Sections 8.4.1.k.

13.3C.8.29 *EOF Activation and Staffing*

Technical Information in the Emergency Plan: [H.4] (8.4.1.i of NUREG–0737, Supplement 1) Section II.H.3 states that the EOF is staffed and activated for Alert and higher declarations using EPIPs and Table II.B-1 position staffing and times. Table II.B-1 lists the EOF staffing that includes the Communicator, Emergency Officer, Radiation Protection Coordinator, and RET Sampler or Radiation Protection Technician, all with 60-minute augmentation times. Section II.H.1.d states that the EOF is where the Emergency Officer directs a staff in overall company emergency activities. Section II.B.1, "Onsite Emergency Organization," states that the Emergency Officer is a qualified senior manager. The augmentation time is 60 minutes for EOF personnel; Table 2 in Supplement 1 to NUREG–0737 lists 30- and 60-minute augmentation times. In RAI 13.03-08.05, the staff requested additional information regarding how the 60-minute augmentation time for the EOF staffing meets the goal of 30 and 60 minutes in Table 2 of Supplement 1 to NUREG–0737. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), states that Table II.B-1 is based on NRC guidance in NUREG-0654/FEMA-REP-1, Revision 1 (Table 2 in NUREG–0737, Supplement 1) and Revisions 2 and 3 of RG1.101. The applicant stated that Table II.B-1 includes enhancements resulting from multiple years of experience gained through operating the existing Fermi 2. In

addition, the proposed ERO staffing requirements can look to the proven effectiveness of the existing Fermi 2 ERO's response to multiple drills, exercises, and emergency events.

Technical Evaluation: [H.4] (8.4.1.i of NUREG–0737, Supplement 1) The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-08.05 acceptable because they conform to the guidance in Supplement 1 to NUREG-0737, Section 8.4.1.i. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan included the additional information and textual revision provided in the response to RAI 13.03-08.05. The staff finds that the Fermi 3 Emergency Plan adequately addresses the EOF activation and staffing. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1 and Supplement 1 to NUREG-0737, Section 8.4.1.i.

Other Emergency Facilities and Equipment

13.3C.8.30 *Onsite Monitoring System*

Technical Information in the Emergency Plan: [H.5] Section II.H.4, “Onsite Monitoring Systems,” states that Detroit Edison maintains and operates onsite monitoring systems needed to provide data that are essential for initiating emergency measures and performing accident assessments. The systems monitor for geophysical phenomena, radiological conditions, plant processes, and fire hazards. The seismic monitoring system measures and records the acceleration of the structure and remains in a standby mode until an earthquake causes the system to activate the recording capabilities. Offsite seismic data can also be obtained from the United States Geological Survey’s National Earthquake Information Center or the University of Michigan at Ann Arbor. Section 3.7.4, “Seismic Instrumentation,” of the ESBWR DCD Tier 2 provides details of the system. The RMS data are linked to the plant computer, which allows the data to be passed to the TSC and EOF and provides the needed radiation levels and activity to determine source terms for dose projection procedures. The RMS includes area radiation monitors that directly measure in-plant exposure rates and also include portable continuous air monitors that measure airborne particulates and iodine at various locations. Process monitors are used to measure radioactive noble gas, iodine, and particulates in effluent, gaseous, and liquid streams. High-range accident RMS measure radiation levels at selected locations, including the containment. The process monitoring system provides real-time meteorological data for calculating offsite radiological dose assessments. The emergency response portion of the system interfaces with the meteorological data acquisition system to provide and store data used to project offsite doses. There is a system terminal access in the CR, OSC, TSC, and EOF. The fire detection system is designed to detect visible and invisible smoke and combustion products and/or heat in designated plant areas. Section 9.5.1, “Fire Protection System,” of the ESBWR DCD Tier 2 describes the fire protection system in detail. Section 12.3.4, “Area Radiation and Airborne Radioactivity Monitoring Instrumentation,” of the ESBWR DCD Tier 2 provides details of the radiological monitoring instrumentation. In addition to permanent monitors, portable radiation monitoring and sampling equipment is maintained with other items dedicated for emergency response, which is described in emergency plan administrative procedures and radiation protection procedures. Section II.H.5, “Access to Data from Monitoring Systems,” states that a system of continuous air samplers and environmental monitoring dosimeters surrounding the site monitors offsite environmental radiation, and the Fermi 3 offsite dose calculation manual (ODCM) includes a description of the system.

Technical Evaluation: [H.5] The staff finds that the Fermi 3 Emergency Plan adequately describes the onsite monitoring systems. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.8.31 *Provisions to Acquire Data from Offsite Sources*

Technical Information in the Emergency Plan: [H.6] Section II.H.5 states that Detroit Edison acquires meteorological data from the National Weather Service (NWS) during periods when the primary system is unavailable. Back-up seismic data is available from the U.S. Geological Survey. Other data sources, such as commercial media outlets, may also be used. Offsite environmental radiological monitoring equipment includes a series of continuous air samplers and environmental monitoring dosimeters that surround the facility. The Fermi 3 ODCM describes these monitoring systems. The EOF laboratory is the designated facility for receiving and analyzing environmental samples during emergencies, as are the in-plant Chemistry and Radiation Protection Laboratories. The calibration and operational readiness of all laboratory equipment is assured in accordance with plant procedures. In addition to the monitoring systems, equipment, and radiological laboratory facilities provided at the plant, Detroit Edison maintains arrangements for back-up radiological monitoring and analytical support from offsite organizations. Section II.A of the Emergency Plan describes these arrangements and the capabilities of the facilities. Appendix 2 of the Emergency Plan includes pertinent agreements from these support organizations. Section II.C.3 of the Emergency Plan also provides information concerning available laboratory facilities.

Technical Evaluation: [H.6] The staff finds that the Fermi 3 Emergency Plan adequately describes data acquisition from or emergency access to offsite monitoring and analytical equipment. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.8.32 *Offsite Radiological Monitoring Equipment*

Technical Information in the Emergency Plan: [H.7] Section II.H.6, “Offsite Radiological Monitoring Equipment,” states that offsite radiological monitoring equipment is available for the RETs to assess offsite radiological consequences. Section II.H.6 states that the types of radiological monitoring equipment are described in the EPIPs and the radiation protection procedures.

Technical Evaluation: [H.7] The staff finds that the Fermi 3 Emergency Plan adequately describes the offsite radiological monitoring equipment in the vicinity of the nuclear facility. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.8.33 *Meteorological Instrumentation*

Technical Information in the Emergency Plan: [H.8] Section II.H.7, “Meteorological Instrumentation and Procedures,” states that Fermi 3 shares its meteorological monitoring system with Fermi 2 and thus meets the requirements of RG 1.23, “Meteorological Monitoring Programs for Nuclear Power Plants.” Both primary and secondary sensors are located on an onsite, 60-meter tower at elevations of 10 and 60 meters, respectively. These sensors monitor wind speed and direction, temperature, delta temperature, Pasquill stability class, and sigma theta. Only the primary system also monitors the dew point and precipitation. Instantaneous

and various averaged data are available from dial-up terminals in the CR, TSC, and EOF. If any parameter is unavailable, supplementary data are available from the corporate computer system. In addition, there is a contract with a vendor to provide weather and forecast data; and NWS data are also available by contacting the nearest NWS office.

In addition, Fermi 3 uses the National Oceanic and Atmospheric Administration (NOAA) gauging station at the Fermi 2 intake canal for hydrological monitoring, which records Lake Erie levels. Additional NOAA data are available from gauging stations at Gibraltar, Michigan, about 16 km (10 mi) north-northeast of the plant on the Detroit River; and at Toledo, Ohio, about 35 km (22 mi) south-southwest of the plant on Lake Erie. These data can be obtained by contacting the Toledo Coast Guard.

Additional detailed information describing the Fermi 3 meteorological systems and equipment is in Section 2.3.3 of this SER.

Technical Evaluation: [H.8] The staff finds that the Fermi 3 Emergency Plan adequately describes the meteorological instrumentation and procedures and provisions for obtaining representative current meteorological data from other sources. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1. Additional details on the staff's review of the Fermi 3 meteorological systems and equipment are in Section 2.3.3 of this SER.

13.3C.8.34 *Inspection/Inventory of Emergency Equipment*

Technical Information in the Emergency Plan: [H.10] Section II.H.9, "Emergency Equipment and Supplies / Emergency Kits," states that emergency response facilities and equipment are inspected and inventoried according to emergency plan administrative procedures and other plant procedures. There are quarterly inventories of all emergency equipment and supplies as well as after each use in an exercise, drill, or emergency. During the inventory, radiological monitoring equipment is checked to verify that the required calibration period and location are in accordance with the inventory lists. Surveillances also include an operational check of instruments and equipment, which have a shelf life that is identified, checked, and replaced as necessary. Detroit Edison maintains sufficient reserves of instruments and equipment to replace any items that are removed from emergency kits for calibration or repair.

Technical Evaluation: [H.10] The staff finds that the Fermi 3 Emergency Plan adequately describes provisions for inspecting inventory and operationally checking emergency equipment and instruments at least once each calendar quarter and after each use. The staff also finds that sufficient reserves of instruments and equipment to replace any that are removed from the inventory for calibration or repair. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.8.35 *Emergency Kits*

Technical Information in the Emergency Plan: [H.11] Section II.H.9 provides a list of general categories of emergency equipment including communications equipment, protective clothing, respiratory protection equipment, environmental monitoring equipment, decontamination supplies, and miscellaneous tools. The specific equipment and supplies are described in emergency plan administrative procedures and radiation protection procedures.

Technical Evaluation: [H.11] The staff finds that the Fermi 3 Emergency Plan adequately describes the general categories of emergency kits including protective equipment, communications equipment, radiological monitoring equipment and emergency supplies. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.8.36 *Location to Coordinate Field Monitoring Data*

Technical Information in the Emergency Plan: [H.12] Section II.H.10, "Receipt of Field Monitoring Data," states that radiological assessment personnel in the EOF, when the EOF is operational, are designated as the central point for the receipt and analysis of offsite radiological field monitoring data results and sample media analysis results that are collected by the RET personnel. Sampling and analysis equipment is available to determine the activity of samples.

Technical Evaluation: [H.12] The staff finds that the Fermi 3 Emergency Plan adequately describes the establishment of a central point for the receipt and analysis of all field monitoring data and coordination of sample media at the EOF Environmental Lab. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.8.37 *Facilities and Supplies for Emergency Medical Treatment*

Technical Information in the Emergency Plan: {Appendix E, Section IV.E.4} Section II.L.2, "Onsite First Aid Capability," describes that at least two first aid qualified personnel are onsite on a 24-hour basis. The onsite nurse is responsible for first aid treatment and the decision for offsite medical assistance during normal hours of operation. The Plant First Responder will perform these duties during off hours. Additional first aid support is available from operations personnel, personnel in the CR or OSC, and Radiation Protection Personnel if necessary. The Onsite medical facility at Fermi 3 is designed to provide basic first responder aid to injured or ill personnel prior to arrival of offsite medical support. Supplies and equipment maintained at the onsite medical facility are described in emergency plan administrative procedures.
Section 13.3, "Emergency Planning," of the ESBWR DCD Tier 2 and Section 13.3 of the Fermi 3 FSAR state that decontamination facilities and supplies for use by on-site personnel are provided in the service building adjacent to the main change rooms. Section II.K.6, "Contamination Control Measures," states that personnel that are contaminated are directed to the appropriate onsite or offsite decontamination facilities. Section II.J.3, "Personnel Monitoring and Decontamination," states that personnel monitoring and decontamination is performed in accordance with radiation protection procedures.

Technical Evaluation: **{Appendix E, Section IV.E.4}** The staff finds the Fermi 3 Emergency Plan adequately describes the sites facilities and medical supplies available for emergency first aid treatment. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.E.4.

13.3C.8.38 *Maintenance of Emergency Equipment and Supplies*

Technical Information in the Emergency Plan: {Appendix E, Section IV.G} As stated in Subsection 13.3C.8.34 of this attachment, Section II.H.9 of the Fermi 3 Emergency Plan describes and evaluates the emergency response facilities, equipment inspections, and inventory programs and administrative procedures. Section II.P.3, "Plan Reviews and Updates," states that the Supervisor of Emergency Planning is responsible for an annual review of the

Emergency Plan to ensure that the plan and its supporting agreements are current. The Supervisor of Emergency Planning also identifies topics for consideration and possible changes to the plan. Section II.P.4, "Distribution of Revised Plans," states that the Supervisor of Emergency Preparedness determines which recommended changes are incorporated into the Emergency Plan, including changes to implementation or administrative procedures. Any revisions should be in accordance with the plant review and approval processes. The EPIPs are distributed on a controlled basis to the ERFs and other agencies in accordance with the plant's document control distribution process.

Technical Evaluation: {Appendix E, Section IV.G} The staff finds that the Fermi 3 Emergency Plan adequately describes the provisions for ensuring that the plan remains current—such as maintaining up-to-date implementation procedures and emergency equipment and supplies. The staff finds the plan acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.G.

13.3C.8.39 *ERDS Description, Testing, and Activation*

Technical Information in the Emergency Plan: {Appendix E, Section VI} Section II.E.1.b, "Offsite Emergency Response Organizations," states that the ERDS will be initialized within 1 hour of the declaration of an Alert or higher. Section II.H.1.b, "Technical Support Center," states that CR communications with the NRC include the transmission of information using the ERDS.

Subsection 9.5.2.5-4-A, "Offsite Interfaces (2)," of the ESBWR DCD Tier 2 states that the applicant will describe the methods of communications from the CR, TSC, and EOF to the NRC, including the establishment of the ERDS in accordance with NUREG–0696. Subsection 7.1.4.2, "N-DCIS Nonsafety-Related Design Bases Summary," of the ESBWR DCD Tier 2 states that the design bases for the N-DCIS includes providing secure data communications to authorized external systems including the TSC, EOF, and ERDS. Subsection 7.1.4.8.4, "Plant Computer Functions (PCF) Description Summary," of the ESBWR DCD Tier 2 states that the PCF provides support functions for secure communications to the TSC, EOF and ERDS. Subsection 7.5.1.2, "System Description," of the ESBWR DCD Tier 2 states that the nonsafety part of post-accident monitoring (PAM) includes the SPDS, the emergency response facilities information systems, and the ERDS. Subsection 2.3.3.1.5, "Data Reduction and Transmission," of the Fermi 3 FSAR states that the NRC can receive selected meteorological data through the ERDS. Section II.F.1.a.5 describes the ERDS as a communication system from the utility to the NRC. Section II.N.2, "Drills," states that communications between the CR, TSC, and EOF to NRC Headquarters and Regional Operations Centers shall be tested monthly.

(10 CFR 50.72(a)(4)) Section II.E.1.b states that the ERDS will be initialized within 1 hour of the declaration of an Alert or higher.

Technical Evaluation: {Appendix E, Section VI} (10 CFR 50.72(a)(4)) The staff finds that the Fermi 3 Emergency Plan adequately describes the ERDS as a direct near real-time electronic data link between the licensee's onsite computer system and the NRC Operations Center that provides automated transmission of a limited data set of selected parameters and an established testing frequency. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section VI. The staff also finds that the Fermi 3 Emergency Plan adequately describes the activation of the ERDS and the regulatory requirements in 10 CFR 50.72(a)(4).

13.3C.8.40 *ERO Augmentation at Alternative Facility*

Technical Information in the Emergency Plan: {Appendix E, Section VI.E.8.b, c & d} Section II.H.1.d in the Fermi 3 Emergency Plan describes an Alternate EOF (AEOF) located at the Western Wayne Center, approximately 35 km (22 mi) northwest of Fermi 3. The facility has adequate communications equipment and sufficient space to accommodate the additional personnel required for the continued capability of dose projection and decision making, including the coordination of the offsite teams. Personnel will be provided with portable equipment to enable them to perform their assigned functions. Activation and support functions of the AEOF are described in the EPIPs. The Fermi 2 Emergency Response Plan (Revision 40, page H-4) identifies the same AEOF located at the Western Wayne Center. In RAI 13.03-94, the staff requested additional information as to whether the space available in the Western Wayne Center was evaluated for an event (such as a security event) that would activate both the Fermi 2 and 3 EROs, to ensure that there is sufficient space to accommodate the additional personnel required by both EROs. The staff requested the applicant to provide documentation for the available space evaluation of the AEOF and to revise the AEOF description in the Emergency Plan to include the capability to support both Fermi 2 and 3 ERO teams in a site event that activates the EROs for both units. In the response to this RAI dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant provided an adequate description of the evaluation performed to demonstrate that the AEOF would have adequate space to support the activation and staffing of both the Fermi 2 and 3 EROs.

Technical Evaluation: {Appendix E, Section VI.E.8.b, c & d } The staff finds the additional information submitted in the response to RAI 13.03-94 to be acceptable because it conforms to the guidance in NSIR/DPR-ISG-01, Section IV.D. The staff also finds that the Fermi 3 Emergency Plan adequately describes the AEOF. The description includes the activation, support functions, location, communications equipment, space to accommodate the additional personnel required for the continued capability of dose projection, decision making capability, coordination of the offsite teams, and portable equipment of the AEOF. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Sections IV.E.8 (c) and (d), and conforms to the guidance in NSIR/DPR-ISG-01. Verification that a future revision of the COL application incorporates the applicant's proposed changes in RAI 13.03-94 is being tracked as Confirmatory Item 13.03-81. The staff verified that the proposed changes in the RAI response are included in Part 5 to the COL application Revision 7. Therefore, Confirmatory Item 13.03-81 is resolved.

13.3C.8.41 *Conclusion*

The staff reviewed the Fermi 3 Emergency Plan and its provisions for emergency facilities and equipment. The staff finds that the plan is acceptable and meets the requirements of 10 CFR 50.34; 10 CFR 50.47(b)(8); 10 CFR 50.72(a)(4); 10 CFR Part 50, Appendix E, Sections IV.E, G, and VI; and the guidance in NUREG-0654/FEMA-REP-1, Planning Standard H; and NUREG-0737, Supplement 1.

13.3C.9 Accident Assessment

13.3C.9.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(9), the staff evaluated the plan against the detailed evaluation

criteria in NUREG–0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against applicable regulatory requirements related to the area of "Accident Assessment" in Appendix E to 10 CFR Part 50 and 10 CFR 50.34.

13.3C.9.2 *Initiating Conditions for Emergency Classes*

Technical Information in the Emergency Plan: [I.1] Section II.I.1, “Parameters Indicative of Emergency Conditions,” states that plant system and effluent parameter values are utilized to determine accident severity and subsequent emergency classification, as described in Section II.D of this Emergency Plan. Environmental and meteorological events are also determining factors in emergency classifications. EPIP “Emergency Classification” identifies plant systems and effluent parameters that are indicative of off-normal or accident conditions and includes the various indications that correspond to the emergency initiating conditions. Section II.H describes the instrumentation and equipment capabilities available for each ERF.

Evaluation of plant conditions is accomplished through the monitoring of plant parameters from indications both in the CR and within the plant. Some of the more important plant parameters to be monitored in the CR are assembled into a single display location (i.e., the SPDS). As indicated earlier, the SPDS monitors parameters relative to the plant design such as the reactor coolant system pressure, containment pressure, reactor power, safety system status, containment radiation level, and effluent monitor readings.

Technical Evaluation: [I.1] The staff finds that the Fermi Emergency Plan adequately identifies plant system and effluent parameter values characteristic of a spectrum of off-normal conditions and accidents, and identifies the plant parameter values or other information which correspond to the emergency action level initiating conditions. The staff's technical evaluation of parameter values and the corresponding emergency classification level is discussed in Subsection 13.3C.4.2 of this SER. Therefore, the staff finds this information acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.9.3 *Capability to Continuously Assess an Accident*

Technical Information in the Emergency Plan: [I.2] (10 CFR 50.34(f)(2)(xvii)) Section II.I.1 states that the resources available to provide initial and continuing information for an accident assessment throughout the course of an event include plant parameter display systems, a liquid and gaseous sampling system, area and process radiation monitoring systems, and the accident radiation monitoring system (which includes the high-range containment radiation monitors). Section II.I.2, “Plant Monitoring Systems,“ states that the initial values and continuing assessments of plant conditions through the course of an emergency may rely on reactor coolant sample results, radiation and effluent monitors, in-plant iodine instrumentation, and containment radiation monitoring. Section II.I.8, “Measuring Radioiodine Concentrations,” states that Detroit Edison equips RETs with portable air samplers, appropriate sample media, and analytical equipment capable of detecting radioiodine concentrations at or below 1E-7 microcuries per cubic centimeter (µCi/cc) under field conditions. Appendix 4, “Radiological Monitoring and Assessment,” of the Emergency Plan provides additional information regarding plant monitoring systems that are significant to ongoing and continuous radiological assessments.

In RAI 13.03-09-02, the staff requested information regarding post-accident sampling capabilities. The applicant’s response dated December 7, 2009 (ADAMS Accession

No. ML093440828), states that post-accident sampling capabilities are addressed in FSAR Section 9.3. In addition, the applicant provided a revised Section II.I.1 that includes a reference to Section 9.3 of the FSAR.

Subsection 9.3.2.2, "System Description," of the Fermi 3 FSAR states that the post-accident sampling program meets the requirements of NUREG–0800, Section 9.3.2 for actions that are required in lieu of a post-accident sampling system. The Post-Accident Sampling Program relies on installed post-accident monitoring instrumentation described in Section 7.5 of the DCD Tier 2 and does not require the capability to obtain and analyze highly radioactive coolant samples, although such samples may be used for emergency classification as well. Plant procedures address obtaining reactor coolant samples from the reactor water cleanup/shutdown cooling (RWCU/SDC) sample line and suppression pool samples from the fuel and auxiliary pools cooling system (FAPCS) sample line, both using the reactor building sample station; and containment atmosphere samples in accordance with the DCD Tier, 2 Section 11.5, "Process Radiation Monitoring System," which states that the process radiation monitoring system (PRMS) allows for the determination of gaseous and liquid process and effluent streams radioactive material content during normal and accident conditions. Subsection 7.5.2.2, "Containment Monitoring System," of the DCD Tier 2 describes the containment monitoring system for gaseous sampling and effluent radiation monitoring and the parameters that are monitored during normal and accident conditions.

Technical Evaluation: [I.2] (10 CFR 50.34(f)(2)(xvii)) The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-09-02 to be acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that the Revision 2 of the Fermi 3 Emergency Plan incorporated the information and textual changes provided in the response to RAI 13.03-09-02. The staff finds that the Fermi 3 Emergency Plan adequately describes the methods of making initial and continuing assessment of plant conditions through the course of an accident. This is acceptable because it meets the requirements in 10 CFR 50.34(f)(2)(xvii) and conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Additional technical details on the staff's review of the Post-Accident Sampling Program is in Section 9.3.2 of this SER, which concludes that the Program meets the guidance in SRP Subsection 9.3.2.I.6 for actions required in lieu of a post-accident sampling system.

13.3C.9.4 *Capability to Determine Source Term*

Technical Information in the Emergency Plan: [I.3a] {Appendix E, Section IV.E.2} Section II.I.3, "Determination of Source Term and Radiological Conditions," describes the use of source term estimations. Core damage estimations provide a means of realistically differentiating between the four (4) damage states (i.e., no damage, clad failure, fuel melt, and vessel melt-through) to: 1) evaluate the status of the fission product barriers and how their status relates to the risks and possible consequences of the accident; 2) provide input on core configuration (i.e., coolable or uncoolable) for prioritization of mitigating activities; 3) determine the potential quality (type) and/or quantity (percent) of source terms available for release in support of projected offsite doses and PARs; 4) provide information that quantifies the severity of an accident in terms that can be readily understood and visualized; and 5) support the determination of radiological protective actions that could be considered for long-term recovery activities. The offsite dose assessment software, Raddose-V, relates various measured parameters, including containment radiation monitor readings, to the source term available for

release within plant systems; and effluent monitor readings, to the magnitude of the radioactive materials available for release.

Appendix 4 Section 2.1, “Source Term Data Input,” of the Emergency Plan states that the typically available monitors used to aid in determining an event’s potential source term include containment high-range radiation monitors; containment bypass monitors; plant vent monitors; and steam line monitors.

Technical Evaluation: [I.3.a] {Appendix E, Section IV.E.2} The staff finds that the Fermi 3 Emergency Plan adequately establishes methods, techniques and equipment to be used for determining the source terms (i.e., releases of radioactive materials) within plant systems based on plant system parameters and effluent monitors and its magnitude. This is acceptable because it meets the requirements of Appendix E, Section IV.E.2 and conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1,

13.3C.9.5 *Capability to Determine the Magnitude of a Radiological Release*

Technical Information in the Emergency Plan: [I.3b] {Appendix E, Section IV.B} Section II.I.3 describes Raddose-V, the offsite dose assessment software, as the method/technique used to determine the magnitude of a radiological release. The software relates various measured parameters, including containment radiation monitor readings, to the source term available for release within plant systems; and effluent monitor readings, to the magnitude of the radioactive materials available for release.

Appendix 4, “Radiological Monitoring and Assessment,” describes the means for relating various measured parameters, including containment radiation monitor readings, to the source term available for release within plant systems; and also describes the means for relating various measured parameters, including effluent monitor readings, to the magnitude of the release of radioactive materials.

Technical Evaluation: [I.3.b] {Appendix E, Section IV.B} The staff finds that the Fermi 3 Emergency Plan adequately establishes methods and techniques to be used for determining the magnitude of releases of radioactive material within plant systems based on plant system parameters and effluent monitors. This is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1, and meets the requirements of Appendix E, Section IV.B to 10 CFR Part 50.

13.3C.9.6 *Relationship Between Effluent Monitors and Exposure*

Technical Information in the Emergency Plan: [I.4] {Appendix E, Section IV.A.4} {Appendix E, Section IV.B} Section II.I.4, “Relationship Between Effluent Monitor Reading and Exposure and Contamination Levels,” states that the EPIPs include the relationship between effluent monitor readings and onsite and offsite exposures and contamination for various meteorological conditions. Appendix 4 provides a description of how the offsite dose assessment program uses dose and dose rate determinations based on plant effluent monitors, and contamination estimates based on deposition assumptions and meteorological conditions in making dose projections using effluent monitors and exposure data.

Technical Evaluation: [I.4] {Appendix E, Section IV.A.4} {Appendix E, Section IV.B} The staff finds that the Fermi 3 Emergency Plan adequately establishes the relationship between

effluent monitor readings and onsite and offsite exposures and contamination for various meteorological conditions and how the data is used to make dose projections. This is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1, and the applicable requirements in Appendix E to 10 CFR Part 50.

13.3C.9.7 *Meteorological Information*

Technical Information in the Emergency Plan: [I.5] Section II.H.7 states the meteorological monitoring system at Fermi 3 is shared with Fermi 2. The meteorological monitoring system meets the requirements of RG 1.23 and provides the capability for predicting atmospheric effluent transport and diffusion. The meteorological system has the capability of being remotely interrogated by multiple users, onsite or offsite. Meteorological data is available in the CR, TSC, and EOF from the plant computer network system and dial-up terminals.

Additional detailed information describing the Fermi 3 meteorological systems and equipment is in Section 2.3.3 of this SER.

Technical Evaluation: [I.5] The staff finds that the Fermi 3 Emergency Plan adequately describes the capability of acquiring and evaluating meteorological information from both onsite and offsite locations. This is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.9.8 *Projecting Dose When Instrumentation is Inoperable*

Technical Information in the Emergency Plan: [I.6] Section II.I.6, “Determination of Release Rates and Projected Doses When Installed Instruments are Inoperable or Off-Scale,” states that EPIPs establish processes for estimating release rates and projected doses if the associated instrumentation is inoperable or off-scale. The capability for projecting offsite dose and dose rates due to actual or potential airborne releases is via the Raddose-V computer program interfaced with the plant process computer. Raddose-V is available in the CR, TSC, and EOF. The manual version of Raddose-V can be available in other onsite/offsite facilities and locations. The basic methodology used to calculate the offsite radiological dose and dose rates was developed by and agreed upon by the applicant, Entergy Nuclear (Palisades), and American Electric Power (D.C. Cook) and accepted by the State of MDEQ for use in emergency planning.

Technical Evaluation: [I.6] The staff finds that the Fermi 3 Emergency Plan adequately establishes the methodology for determining the release rate/projected doses if the instrumentation used for assessment is off-scale or inoperable. This is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.9.9 *Field Monitoring Capability*

Technical Information in the Emergency Plan: [I.7] Section II.I.7, “Field Monitoring Capability,” states that the RETs perform field monitoring within the plume exposure pathway. These teams are trained to conduct field surveys, obtain air samples, and collect environmental samples, and are qualified in accordance with RG 1.8, Revision 3, and the emergency preparedness training requirements described in Section II.O of the Emergency Plan. EPIPs provide guidance for performance of field monitoring team activities. RETs are equipped with air sampling equipment, personnel dosimetry, radiological survey instruments, procedures,

communications equipment, and supplies to facilitate performance of radiation, surface contamination, and airborne radioactivity monitoring.

Technical Evaluation: [I.7] The staff finds that the Fermi 3 Emergency Plan adequately describes the capability and resources for field monitoring within the plume exposure emergency planning zone. This is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.9.10 *Capability to Rapidly Assess Radiological Hazards*

Technical Information in the Emergency Plan: [I.8] Section II.I.7 states that the RETs perform field monitoring within the plume exposure pathway. These teams are trained to conduct field surveys, obtain air samples, and collect environmental samples. Two to four teams are available and can be dispatched within 30 to 60 minutes of an emergency declaration. RET vehicles are equipped with a radio to provide mobile communications carried over Detroit Edison UHF service frequencies assigned to Western Wayne County. The radio-control-console for directing actions of the offsite RETs is located in the EOF/RET Dispatch Room. The information collected is forwarded to the TSC or EOF when activated. The EOF laboratory may be used for the receipt and qualitative analysis of all environmental sample media.

If necessary, supplemental teams trained in field survey and monitoring techniques can be called out or may be requested through mutual assistance agreements established with Entergy Nuclear Palisades, L.L.C. and Indiana Michigan Power to provide support during an emergency. A description of the agreement is in Section II.C of the Emergency Plan. The teams are also equipped with appropriate monitoring and sampling equipment. Data from the supplemental field monitoring team(s) is also reported to the EOF.

Technical Evaluation: [I.8] The staff finds that the Fermi 3 Emergency Plan adequately describes methods, equipment, deployment times and expertise to rapidly conduct offsite assessment of radiological hazards. This is acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.9.11 *Capability to Measure Radioiodine Concentrations in Air*

Technical Information in the Emergency Plan: [I.9] Section II.I.8, “Measuring Radioiodine Concentrations,” states that RETs are equipped with portable air samplers, appropriate sample media, and analysis equipment capable of detecting radioiodine concentrations at or below 1E-7 µCi/cc under field conditions, taking into consideration potential interference from noble gas activity and background radiation. The collected air sample is measured by hand held survey meter as an initial check of the projection derived from plant data to determine if significant quantities of elemental iodine have actually been released.

Technical Evaluation: [I.9] The staff finds that the Fermi 3 Emergency Plan adequately describes a capability to detect and measure radioiodine concentrations in air in the plume exposure EPZ as low as 10^{-7} µCi/cc under field conditions. This is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.9.12 *Means to Relate Various Parameters to Dose Rates*

Technical Information in the Emergency Plan: [I.10] Section II.I.7 describes the EAL-based PARs that Detroit Edison provides, based on offsite dose projections. The radiation protection staff is responsible for conducting offsite dose projections periodically throughout any emergency during which there is an actual or potential release of an amount of radioactive material that is likely to result in offsite consequences.

Section II.I.9, "Relating Measured Parameters to Dose Rates," states Appendix 4 of the Emergency Plan describes the means for relating measured parameters to dose rates for those key isotopes listed in Table 3 of NUREG–0654/FEMA-REP-1. Appendix 4 describes the provisions for estimating the projected dose based on projected and actual dose rates using the Raddose-V software designed to estimate dose rates from inhalation and ground deposition, and calculate deposition rates at 15-minute intervals. The user is able to estimate release rates from plant specific radiation monitor readings and flow rates by direct input, by back calculating from field data, or by grab sample analysis. From these estimates, integrated doses and total deposition are calculated for the length of time covering the release of radioisotopes. Doses and deposition are determined at radial grid and special receptor locations surrounding the facility, based on radiological and meteorological data collected at the plant.

Technical Evaluation: **[I.10]** The staff finds that the Fermi 3 Emergency Plan adequately establishes a means for relating the various measured parameters (e.g., contamination levels, water and air activity levels) to dose rates for key isotopes and gross radioactivity measurements. The Fermi 3 Emergency Plan also adequately describes provisions for estimating integrated dose from the projected and actual dose rates and for comparing these estimates with the protective action guides. This is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.9.13 *Conclusion*

The staff reviewed the Fermi 3 Emergency Plan in regards to Planning Standard I, "Accident Assessment" of NUREG–654/FEMA-REP-1 Revision 1 and applicable regulation and concludes that the information provided in the Fermi 3 Emergency Plan regarding accident assessment is acceptable and meets the requirements of 10 CFR 50.34(f)(2)(xvii), 10 CFR 50.47(b)(9), 10 CFR Part 50, Appendix E, and complies with the guidance in NUREG-0654/FEMA-REP-1 Planning Standard I.

13.3C.10 Protective Response

13.3C.10.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(10), the staff evaluated it against the detailed evaluation criteria in NUREG–0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against Appendix E, Section IV.3 to 10 CFR 50.

13.3C.10.2 *Warning Onsite Personnel*

Technical Information in the Emergency Plan: [J.1.a-d] Section II.J.1, "Onsite Notification," states in the event of an emergency, methods are established for notifying personnel within the

Protected Area, including employees, visitors, and contractor personnel. The primary means of notification within the Protected Area is the evacuation alarm and remote warning system. The system provides an audible signal that alerts personnel of an emergency event via siren and public address announcement which includes the emergency classification and response actions to be taken. The In-Plant PA/PL system may also be used for notification inside the Protected Area. In high noise areas where these systems may not be audible, other measures such as visible warning signals or personal notifications may be used.

Individuals located outside of the Protected Area but inside the owner-controlled area are informed via audible warnings provided by warning systems and the security force. If needed, local law enforcement personnel warn individuals located outside of the Protected Area but inside the owner-controlled area. In RAI 13.03-10.01, the staff requested a discussion on why the audible warnings from the warning systems and from the activities of the security force may not successfully notify individuals outside of the Protected Area but inside the owner-controlled area. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), states that the individuals located within the owner-controlled area but outside of the Protected Area are notified of emergency conditions through audible warnings from the warning systems and from the activities of the security force.

Information regarding the meaning of the various warning systems and the appropriate response actions is provided through plant training programs, visitor orientation, escort instructions, posted instructions, or in the content of audible messages. Escorts provide response instructions to visitors. All individuals in the Protected Area are notified within about 15 minutes of the declaration of any emergency requiring individual response actions, such as accountability or evacuation. In RAI 13.03-10.02, the staff requested additional information regarding the time needed to notify persons outside of the Protected Area but within owner-controlled areas. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), describes the ability to notify all individuals in the owner-controlled area within about 15 minutes of an incident requiring protective actions.

Technical Evaluation: [J.1.a-d] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAIs 13.03-10.01 and 13.03-10.02 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAIs 13.03-10.01 and 13.03-10.02. The staff finds that the Fermi 3 Emergency Plan adequately establishes the means and the amount of time required to warn or advise onsite individuals and those who may be in areas controlled by the operator, including employees who do not have emergency assignments; visitors; contractor and construction personnel; and other persons who may be in or passing through the onsite public access areas; or persons who are within the owner-controlled area. This clarification is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.10.3 *Evacuation Routes for Onsite Personnel*

Technical Information in the Emergency Plan: [J.2] Section II.J.2, "Evacuation Routes and Transportation," states that Nuclear Security is responsible for directing traffic and controlling personnel as they leave Fermi 3 in an emergency, including special provisions for a coordinated evacuation under severe conditions such as inclement weather; large groups of personnel who need to be evacuated; or a high-level radioactive release. If an onsite evacuation is inadvisable due to adverse conditions such as weather-related, radiological, or traffic density conditions,

affected individuals will be directed to a safe onsite area determined by the Emergency Director for accountability. If necessary, there will be contamination monitoring and decontamination. Individuals will be informed of the evacuation routes with appropriate instructions via plant training programs, visitor orientation, escort instructions, posted instructions, or in the content of audible messages.

Figure II.J-2, "Evacuation Routes and Assembly Areas," identifies the evacuation routes and relocation and monitoring centers for persons leaving Fermi 3. Evacuated personnel will be directed to assemble at the Newport Service Center, Dixie Warehouse, and Trenton Channel Power Plant; or they will be sent home. In RAI 13.03-10.03, the staff requested the applicant to provide a letter of agreement from the Newport Service Center, Dixie Warehouse, and Trenton Channel Power Plant. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), stated that the Newport Service Center, Dixie Warehouse, and Trenton Channel Power Plant are owned and operated by Detroit Edison. Therefore, no LOAs are necessary for the use of these facilities. Pre-planned evacuation routes are established and maintained to be consistent with the EPIPs. There is a secondary route for site evacuation in the event that the primary route is rendered impassable because of radiological or meteorological conditions or other impediments to evacuation. The Emergency Director determines the travel directions and offsite assembly area(s) based on current meteorological and emergency conditions. Affected individuals will evacuate the site via their personal vehicles. If any individual onsite does not have access to a personal vehicle, arrangements will be made for transportation with another evacuating individual. In RAI 13.03-10.04, the staff requested additional information regarding the process for arranging transportation for individuals without vehicles. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), provided a revised Section II.J.2 of the Emergency Plan that directs the security force to arrange for transportation from the site for any individual who is unable to arrange for transportation.

Technical Evaluation: [J.2] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAIs 13.03-10.03 and 13.03-10.04 acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi Emergency Plan incorporated the information and textual changes in the response to RAIs 13.03-10.03 and 13.03-10.04. The staff finds that the Fermi 3 Emergency Plan adequately describes provisions for evacuation routes and for transporting onsite individuals to a suitable offsite location, including alternatives for inclement weather; high traffic density; and specific radiological conditions. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.10.4 *Radiological Monitoring of Onsite Personnel*

Technical Information in the Emergency Plan: [J.3] Section II.J.3, "Personnel Monitoring and Decontamination," states that the Emergency Director is responsible for monitoring the contamination of personnel, vehicles, and personal property when there is a likelihood that individuals and their property may have become contaminated before or during the site evacuation. Personnel evacuating the site will be monitored for contamination as they exit the Protected Area by the portal monitors or will be sent to offsite assembly areas and monitored by portable friskers. Based on the status of the release of radioactive materials from the plant, monitoring may be limited to speed up the evacuation process.

Technical Evaluation: [J.3] The staff finds that the Fermi 3 Emergency Plan adequately provides for radiological monitoring of people evacuated from the site. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.10.5 *Evacuation of Non-Essential Onsite Personnel*

Technical Information in the Emergency Plan: [J.4] Section II.J.4, "Non-essential Personnel Evacuation and Decontamination," states that in the event of a site area or a general emergency, nonessential personnel will be evacuated. The facility will have the appropriate equipment and supplies to facilitate contamination monitoring and decontamination at the relocation and monitoring centers, as needed.

Technical Evaluation: [J.4] The staff finds that the Fermi 3 Emergency Plan adequately provides for the evacuation of onsite nonessential personnel in the event of a "site area emergency" or "general emergency" and provides a decontamination capability. These provisions are acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.10.6 *Onsite Personnel Accountability*

Technical Information in the Emergency Plan: [J.5] Section II.J.5, "Personnel Accountability," states that a capability is in place to account for all individuals in the Protected Area and to determine the identities of any missing individuals within 30 minutes following the declaration of a site area emergency or a general emergency. As individuals exit the Protected Area, they leave their identification badges with Nuclear Security personnel. Security will begin the accountability process using either the security computer system or by visual inspection using the badge exchange system and will report the results of the accountability process to the Emergency Director. Once established, accountability within the Protected Area is maintained throughout the course of the event, unless specifically terminated by the Emergency Director. EPIPs describe the accountability process, which is consistent with the requirements of the Fermi 3 Security Plan.

Technical Evaluation: [J.5] The staff finds that the Fermi 3 Emergency Plan adequately provides for a capability to account for all individuals onsite at the time of the emergency, to ascertain the names of missing individuals within 30 minutes of the start of an emergency, and to account for all onsite individuals continuously thereafter. The Emergency Plan is therefore acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.10.7 *Protection for Personnel Remaining or Arriving Onsite*

Technical Information in the Emergency Plan: [J.6.a-c] Section II.J.6, "Protective Measures," states that adequate supplies of radiation protection equipment are maintained for personnel remaining in or entering the Protected Area or ERFs, including respiratory protection equipment; protective clothing; and radioactive protective drugs (i.e., potassium iodide [KI]). This emergency equipment is listed, maintained, and inspected in accordance with radiation protection procedures. The onsite medical facility maintains adequate amounts of KI to support the onsite ERO for emergency situations, as determined and authorized by the Emergency Director. Onsite supplies of protective clothing and respiratory protection equipment may be augmented by supplies provided by offsite responders, such as firefighters responding to the site.

Technical Evaluation: [J.6.a-c] The staff finds that the Fermi 3 Emergency Plan adequately provides for individual respiratory protection, the use of protective clothing, and radioactive protective drugs (i.e., KI). These provisions are therefore acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.10.8 *Recommending of Protective Actions*

Technical Information in the Emergency Plan: [J.7] {Appendix E, Section IV.3}
Section II.J.6 states the Emergency Director makes decisions regarding appropriate protective measures based on an evaluation of conditions on the site, including input from the Nuclear Security. If the Emergency Director determined that personnel assembly, accountability, and evacuation could result in undue hazards to site personnel, the Emergency Director may issue other protective measures.

In Section II.J.7, "Protective Action Recommendations and Bases," descriptions of public PARs show that they are based on plant conditions, estimated offsite doses, or some combination of both. Government officials in affected states and counties promptly receive PARs; offsite agencies receive PARs within 15 minutes of a general emergency declaration and within 15 minutes of a change in status of a PAR. In RAI 13.03-02-03, the staff requested a description of the process for making offsite dose projections and how they are transmitted to State and local authorities, to the NRC, and to other appropriate governmental entities. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828), states that the Emergency Director or Emergency Officer is responsible for communicating offsite dose projections to Federal, State, and local authorities. The response also includes revisions to Table II.B-2 identifying that the Emergency Director has these responsibilities and added text to Section II.J.7 of the Emergency Plan that specifically discusses these responsibilities.

There are PARs based on offsite dose projections, in addition to the EAL-based PARs. The Radiation Protection staff is responsible for measuring offsite dose projections periodically during any emergency, when there is an actual or potential release of an amount of radioactive material that is likely to result in offsite consequences. Emergency plan implementation procedures establish the requirements for performing required dose calculations and projections. The projected doses are compared to the Protective Action Guides (PAGs) in Table II.J-1, "Protective Action Guides," which are derived from EPA 400-R-92-001, "The Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," and Supplement 3 to NUREG–0654/FEMA REP-1, Revision 1. Table II.J-1 identifies specified dose limits governing evacuation (or shelter). In RAI 13.03-10.05, the staff requested information regarding the use of sheltering for the public as a potential protective action recommendation. In the response dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant stated that Section II.J.7 of the Emergency Plan refers to Table II.J-1, which provides for both evacuation and sheltering. The applicant provided new tables including Table II.J-2, "Exposure Pathways, Incident Phases, and Protective Actions"; and Table II.J-3, "Representative Shielding Factors from Gamma Cloud Source," which describe potential PAR actions. In Supplemental RAI 13.03-14, the staff requested the applicant revise the Emergency Plan's description of the Emergency Directors expected PAR actions to be taken for a general emergency declaration to be consistent with 10 CFR 50.47 (b)(10) RIS 2004-13, "Consideration of Sheltering in Licensee's Range of Protective Action Recommendations," and NUREG–0654, Supplement 3. The applicant's response to Supplemental RAI 13.03-14 dated June 25, 2010 (ADAMS Accession No. ML101790463), stated that, Section II.J.7 will be revised to clarify that an evacuation will not be recommended if conditions make evacuation dangerous. Furthermore, to

aid in determining appropriate protective actions, the applicant will add Table II.J-3, which contains representative shielding factors provided by typical structures against direct exposure from the plume. In RAI 13.03-87, the staff asked the applicant to revise the Fermi 3 Emergency Plan description of the Emergency Directors expected PAR actions to be taken for a general emergency declaration. The revision should consider the use of KI to be consistent with 10 CFR 50.47 (b)(10). The applicant's response to RAI 13.03-87 dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant stated that the Fermi 3 Emergency Plan discussion of the Emergency Director's process for developing PARs will be revised to consider administering stable iodine after a general emergency declaration. In RAI 13.03-103, the staff requested the applicant to revise the emergency response plan to include the use of NRC-approved evacuation time estimates (ETEs) and updates to the ETEs in formulating the PARs. In the response to this RAI dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant provided a revision to the Fermi 3 Emergency Plan that included the use of the ETEs in the development of the PARs.

Technical Evaluation: [J.7] The staff finds that the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAIs 13.03-02-03, 13.03-10.05, 13.03-87 and Supplemental RAI 13.03-14 are acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAIs 13.03-02-03, 13.03-10.05, 13.03-87, and Supplemental RAIs 13.03-14. The staff finds that the Fermi 3 Emergency Plan adequately establishes a mechanism for recommending protective actions to the appropriate State and local authorities. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

The staff created Confirmatory Item 13.03-72 to track the revision in the Emergency Plan regarding the Emergency Director's process for developing PARs and for administering stable iodine (i.e., potassium iodide) as a consideration. The staff verified that Emergency Plan Revision 4 includes the PARs and the proper administration of iodine. Therefore, Confirmatory Item 13.03-72 is resolved.

Technical Evaluation: {Appendix E, Section IV.3} The staff finds that the additional information submitted in the response to RAI 13.03-103 is acceptable because it meets the requirements in 10 CFR 50.47(b)(10) and 10 CFR Part 50, Appendix E, Section IV.1. The staff also finds that the Fermi 3 Emergency Plan adequately establishes a mechanism for recommending protective actions to the appropriate State and local authorities. Verification that a future revision of the COL application incorporates the applicant's proposed changes was tracked as Confirmatory Item 13.03-82. The staff verified that the proposed changes in the RAI response are included in Part 5 to the COL application Revision 7. Therefore, Confirmatory Item 13.03-82 is resolved.

13.3C.10.9 *Evacuation Time Estimates*

Technical Information in the Emergency Plan: [J.8] Section II.J.8, "Evacuation Time Estimates," states that the ETE is summarized in Appendix 5, "Evacuation Time Estimate Summary," of the Fermi 3 Emergency Plan, and that the ETE is consistent with the guidance in Appendix 4 of NUREG–0654/FEMA-REP-1, Revision 1.

Technical Evaluation: [J.8] The staff finds that the Fermi 3 Emergency Plan adequately provides time estimates for the evacuation of the general public within the plume exposure EPZ.

Section 13.3C.18 of this SER includes details of the staff's review of the Fermi 3 ETE, which the staff finds acceptable because it meets the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.10.10 Plans to Implement Protective Measures

Technical Information in the Emergency Plan: [J.10.a] Section II.J.10, "Protective Measures Implementation," of the Fermi 3 Emergency Plan refers to Appendix 5, "Evacuation Time Estimate Summary," which provides a map of the plume exposure pathway EPZ illustrating evacuation routes; protective action areas (PAAs); pre-selected radiological sampling and monitoring points; and locations of shelter areas and relocation centers. In RAI 13.03-10-06(.1), (.2), (.3), the staff requested a map that identifies evacuation routes; pre-selected radiological sampling and monitoring points; and relocation centers in host areas. In the response to RAI 13.03-10.06.1 dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant provides Figure 10-2, "Evacuation Routes for PAA 1, 3 and 5"; and Figure 10-3, "Evacuation Routes for PAA 2 and 4." These figures show the evacuation routes from the EPZ. In the response to RAI 13.03-10-06.2 dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant stated that the protocol for the offsite dose assessment does not include pre-selected radiological sampling and monitoring points. In lieu of those points, the protocol relies on atmospheric transport and diffusion plume projections using the Raddose V software. Sections II.B and II.I of the Emergency Plan describe the activities of the Radiation Protection Advisor, Radiation Protection Coordinator, Dose Assessor, and RET Coordinator. As indicated in Table II.B-2, the Radiation Protection Coordinator determines survey areas for offsite RETs, and the RET Coordinator coordinates the efforts of the offsite RETs. Section II.I.7 of the plan provides additional information regarding RET activities. RETs are equipped with maps and global positioning system (GPS) devices to assure that there will be proper sampling locations consistent with the stated directions. According to the applicant's description, these activities are conducted in accordance with the requirements of the EPIPs "Dose Assessment Methodology" and "Onsite/Offsite Radiological Monitoring," which are listed in Appendix 6 of the Fermi 3 Emergency Plan. The applicant stated that following this protocol eliminates the need for a map that identifies pre-selected radiological sampling and monitoring points. In Supplemental RAI 13.03-15, the staff requested the applicant to revise the plan to include a description of how radiological offsite survey data are communicated in a uniform, understandable, and useable manner to offsite stakeholders in accordance with the NUREG-0654 evaluation Criterion II.J.10.a. In the response to Supplemental RAI 13.03-15 dated June 25, 2010 (ADAMS Accession No. ML101790463), the applicant stated that the Emergency Plan incorrectly states that a map illustrating pre-selected radiological sampling points is included in Appendix 5, and the Emergency Plan will also be corrected to indicate that the RETs rely on GPS devices to determine the location of their survey. The applicant described the process that field teams follow to communicate to users of this information in the EOF. The applicant stated how field information is communicated to the ERO and to the State representatives in the EOF.

In the response to RAI 13.03-10-06.3 dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant provided Figure 10-1, "Fermi Nuclear Power Plant Reception Centers and Host Schools," which shows the relocation centers in the host areas.

Technical Evaluation: [J.10.a] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAIs 13.03-10.06.1, 13.03-10-06.2, RAI 13.03-10.06.3, and Supplemental RAI 13.03-15 acceptable because they conform to the

guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAIs 13.03-10.06.1, 13.03-10-06.2, 13.03-10-06.3, and Supplemental RAI 13.03-15. The staff finds that the Fermi 3 Emergency Plan adequately addresses evacuation routes, evacuation areas, preselected radiological sampling and monitoring points, relocation centers in host areas, and shelter areas. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [J.10.b.] Appendix 5 of the Fermi 3 Emergency Plan includes Figure A5-1, "Fermi Nuclear Power Plant Permanent Resident Population by PAA," which identifies the population distribution around the facility according to evacuation area. Appendix 5 of the Emergency Plan summarizes population distributions and contains population by PAA. In RAI 13.03-10-07, the staff requested the applicant to revise the plan to include population information in a sector format consistent with NUREG–0654, Criterion J.10.b. In the response to RAI 13.03-10-07 dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant provided Figure A5-2, "Permanent Residents by Sector," which indicates the population information in a sector format.

Technical Evaluation: [J.10.b] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-10-07 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan provided the information and textual changes provided in the response to RAI 13.03-10-07. The staff finds that the Fermi 3 Emergency Plan includes adequate maps showing population distribution around the nuclear facility by protective action areas as well as by sector. This is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [J.10.c] Section II.J.1 states that individuals located outside of the Protected Area but inside the owner-controlled area are informed through audible warnings emanating from warning systems; the security force; and if needed, from local law enforcement personnel. In RAI 13.03-10.01, the staff requested the applicant to discuss why the audible warnings emitted from warning systems and the activities of the security force may not successfully notify individuals outside of the Protected Area but within the owner-controlled area. The applicant's response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828) recognizes that Section II.J.1 of the plan did not accurately describe local law enforcement responsibilities under emergency conditions. The applicant provided a revised Section II.J.1 to clarify that individuals located in the owner-controlled area but outside of the Protected Area are informed of emergency conditions through audible warnings emanating from warning systems and from the activities of the security force.

Section II.J.10.c states that the Fermi 3 ANS sirens are the primary method of warning the public. The Directors of Monroe and Wayne County Emergency Management are responsible for activating the portion of the system in their respective jurisdictions. Other warning methods may include communications via the telephone; television and radio EAS stations; public address systems; bull horns from patrol cars; and personal contacts. In RAI 13.03-10-08, the staff asked why the description of implementation of PARs did not include the Province of Ontario. The applicant's response to RAI 13.03-10-08 dated December 7, 2009 (ADAMS Accession No. ML093440828), provided a revision to Section II.J.10 that includes the Province of Ontario in the implementation of Fermi 3 PARs.

Technical Evaluation: [J.10.c] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan in the response to RAIs 13.03-10.01 and 13.03-10-08 acceptable, because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAIs 13.03-10.01 and 13.03-10-08. The staff finds that the Fermi 3 Emergency Plan adequately describes the means for notifying all segments of the transient and resident population. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [J.10.m] Section II.J.7 discusses PARs and bases. In addition to the EAL-based PAR, Detroit Edison has PARs based on offsite dose projections. Table II.J-1 compares the projected doses to the PAGs, which are derived from the *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents* (EPA 400-R-92-001) and Supplement 3 to NUREG–0654/FEMA REP-1. PARs are then developed based on the results of these comparisons. Table II.J-2 summarizes possible protective actions that will be implemented by State and local agencies during an emergency. As a further aid in determining appropriate protective actions, Table II.J-3 contains representative shielding factors provided by typical structures against direct exposure from the plume. The EPIP "Protective Action Recommendations" is listed in Appendix 6 and provides details regarding the development of PARs.

Technical Evaluation: [J.10.m] The staff finds that the Fermi 3 Emergency Plan adequately describes a basis for the choice of plume exposure pathway PARs during emergency conditions. This basis includes expected protective factors against direct and inhalation exposures afforded by various shelter structures. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.10.11 *Conclusion*

The staff concludes that the information in the Fermi 3 Emergency Plan regarding the protective response is acceptable because it meets the requirements of 10 CFR 50.47(b)(10), Appendix E, Section IV.3 and conforms to the guidance in NUREG-0654/FEMA-REP-1, Planning Standard J.

13.3C.11 Radiological Exposure Control

13.3C.11.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(11), the staff evaluated the plan against the detailed evaluation criteria in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.11.2 *Onsite Exposure Guidelines*

Technical Information in the Emergency Plan: [K.1.a-g] Section II.K.1, "Onsite Exposure Guidelines and Authorizations," states that all reasonable measures will be taken to keep exposures to emergency personnel for rescue, first aid, decontamination, ambulance, medical treatment, and corrective or assessment actions within 10 CFR Part 20 limits. Table II.K-1 provides dose limits for activities and conditions in accordance with the emergency exposure criteria and guidance in EPA-400-R-92-001.

Technical Evaluation: [K.1.a-g] The staff finds that the Fermi 3 Emergency Plan adequately describes onsite exposure guidelines that are consistent with the guidance in EPA-400-R-92-001 for removing injured persons, undertaking corrective actions, performing assessment actions, providing first aid, performing personnel decontamination, providing ambulance services, and providing medical treatment. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.11.3 *Onsite Radiation Protection Program*

Technical Information in the Emergency Plan: [K.2] Section II.K.1 states that the Emergency Director has the nondelegable responsibility for authorizing personnel exposure levels that exceed 10 CFR Part 20 limits during an emergency. Section II.K.2, "Radiation Protection Program," states that Chapter 12 of the Fermi 3 FSAR provides details regarding the Radiation Protection Program and states that the Radiation Protection Advisor is responsible for implementing radiation protective actions in an emergency. Chapter 12 of the FSAR incorporates by reference NEI 07-03A, "Generic FSAR Template Guidance for Radiation Protection Program Description."

Section II.K.2 provides exposure guidelines for volunteers if exposures are greater than the normal limits. This section states that the Radiation Protection Program and the EPIPs contain provisions to implement emergency exposure guidelines.

Technical Evaluation: [K.2] The staff finds that the Fermi 3 Emergency Plan adequately provides an onsite Radiation Protection Program to be implemented during emergencies, including methods to implement emergency exposure guidelines and plans that identify by position the individual who can authorize exposures in excess of 10 CFR Part 20 limits. This information is acceptable because it conforms to the guidance of NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.11.4 *Capability to Determine the Dose Received by Emergency Personnel*

Technical Information in the Emergency Plan: [K.3.a] Section II.K.3, "Dosimetry and Dose Assessment," states that permanent-record and self-reading dosimeters are provided to emergency responders, including those from offsite locations. The dosimeter ranges are sufficient to measure both routine and accident doses, and these dose assessment capabilities are available on a 24-hour basis. EPIPs establish the requirements for dosimeter distribution.

Technical Evaluation: [K.3.a] {Appendix E, Section IV.E.1} The staff finds that the Fermi 3 Emergency Plan adequately describes provisions for a 24-hour-per-day capability to determine the doses to emergency personnel involved in any nuclear accident and the distribution of dosimeters, both self-reading and permanent record devices. This information is acceptable because it meets the requirements in Appendix E, Section IV.E and conforms to the guidance of NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.11.5 *Dose Records for Emergency Personnel*

Technical Information in the Emergency Plan: [K.3.b] Section II.K.3 states that the external dosimetry program has provisions and requirements for using the permanent record and self-reading dosimeters. The EPIPs establish requirements for distributing dosimeters to emergency responders, including those individuals responding to the site from offsite locations. Table II.B-2

states that the Radiation Protection Advisor ensures that personnel exposure records will be maintained.

Technical Evaluation: [K.3.b] The staff finds that the Fermi 3 Emergency Plan adequately describes the use and distribution of dosimeters and the provisions for maintaining dose records for emergency workers involved in a nuclear accident. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.11.6 *Decontamination Action Levels*

Technical Information in the Emergency Plan: [K.5.a] Section II.K.5, "Decontamination Action Levels," of the Fermi 3 Emergency Plan states that decontamination requirements for personnel and areas, including action levels and criteria, are implemented in accordance with radiation protection procedures.

Technical Evaluation: [K.5.a] The staff finds that the Fermi 3 Emergency Plan adequately specifies action levels for determining the need for decontamination. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.11.7 *Decontamination Facilities and Supplies*

Technical Information in the Emergency Plan: [K.5.b] {Appendix E, Section IV.E.3} Section II.K.5 of the Fermi 3 Emergency Plan states that emergency equipment and supplies are maintained at Fermi 3 and include decontamination supplies identified in Section II.H.9. This section states that the emergency plan administrative procedures and radiation protection procedures describe the equipment, supplies, and locations. Section II.K.6, "Contamination Control Measures," states that personnel will be decontaminated in accordance with established procedures and may be referred to the onsite medical representative, if normal procedures do not reduce contamination to acceptable levels. This section also states that supplies, instruments, equipment, and vehicles will be monitored before being removed from contaminated areas and will be decontaminated in accordance with radiation protection procedures. Ambulances transporting contaminated personnel will be monitored and decontaminated by plant personnel before leaving the medical facility.

Technical Evaluation: [K.5.b] {Appendix E, Section IV.E.3} The staff finds that the Fermi 3 Emergency Plan adequately addresses the decontamination of emergency personnel, wounds, supplies, instruments, and equipment as well as the location of the decontamination equipment. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1 and the requirements of Appendix E to 10 CFR Part 50.

13.3C.11.8 *Onsite Contamination Control*

Technical Information in the Emergency Plan: [K.6.a] Section II.K.6 states that contaminated areas will be designated and identified to minimize the contamination of personnel or the spread of contamination within the plant, and access to these areas will be controlled. Personnel will take required precautionary measures, use protective clothing and equipment and be monitored before leaving contaminated areas.

[K.6.b] Section II.K.6 states that if an uncontrolled release of activity occurs, then eating, drinking, and chewing would be prohibited in all emergency response facilities until surveys show that these activities are permissible.

[K.6.c] Section II.K.6 states that contaminated items and areas will be returned to normal use when contamination levels have returned to acceptable levels, on the basis of the criteria in plant procedures.

Technical Evaluation: [K.6.a-c] The staff finds that the Fermi 3 Emergency Plan adequately addresses the contamination control measures for area access, drinking water, food supplies, and the criteria for permitting the return of areas and items to normal use. These measures are acceptable because they conform to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.11.9 *Capability to Decontaminate Relocated Onsite Personnel*

Technical Information in the Emergency Plan: [K.7] Section II.K.7, "Decontamination of Relocated Site Personnel," of the Fermi 3 Emergency Plan states that radiation protection personnel at the assembly areas monitor and determine the need for decontamination. There are provisions for extra clothing, and suitable decontaminates are available for the expected type of contaminations—particularly with regard to skin contaminations. If it is not possible to do so locally, personnel can be sent to designated locations for monitoring and decontamination. Sections II.J.3 and II.J.4 include additional details describing the facilities used for monitoring and decontamination, in accordance with radiation protection procedures and emergency plan implementation procedures and EPIPs.

Technical Evaluation: [K.7] The staff finds that the Fermi 3 Emergency Plan adequately describes the capability to decontaminate relocated onsite personnel, provisions for extra clothing, and decontaminants suitable for the type of contamination expected. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.11.10 *Conclusion*

The staff concludes that the information in the Fermi 3 Emergency Plan regarding radiation exposure control is acceptable and meets the requirements of 10 CFR 50.47(b)(11) and 10 CFR Part 50, Appendix E, Sections IV.E.1 and 3, and complies with the guidance in NUREG-0654/FEMA-REP-1, Revision 1, Planning Standard K.

13.3C.12 Medical and Public Health Support

13.3C.12.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(12), the staff evaluated the plan against the detailed evaluation criteria in NUREG–0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against applicable regulatory requirements related to "Medical and Public Health Support" in Appendix E to 10 CFR Part 50.

13.3C.12.2 *Onsite Medical Services*

Technical Information in the Emergency Plan: [L.2] {Appendix E, Section IV.E.5} Section II.L.2, "Onsite First Aid Capability," states that at least two qualified first aid personnel are onsite on a 24-hour basis. The onsite nurse is responsible for first aid treatment and the decision for offsite medical assistance during normal hours of operation. The plant's first responder will perform these duties during off hours. Additional first aid support is available from operations personnel, from personnel in the CR or OSC, and from Radiation Protection Personnel if necessary. The onsite medical facility at Fermi 3 is designed to provide basic first responder aid to injured or ill personnel before the arrival of offsite medical support. The emergency plan administrative procedures describe the supplies and equipment maintained at the onsite medical facility. Section II.L.1, "Hospital and Medical Support," states that written procedures regarding radiological medical emergencies detail the actions to be taken onsite. These actions include offsite transportation of injured, contaminated individuals and hospital notifications. Appendix 6, "Emergency Plan Implementing and Supporting Procedures (Typical List) and Procedure Cross-Reference to Plan," identifies "Medical Response" as the procedure for this part of the Emergency Plan.

Technical Evaluation: [L.2] {Appendix E, Section IV.E.5} The staff finds that the Fermi 3 Emergency Plan adequately describes the arrangements made for first aid and for the services of medical personnel qualified to handle onsite radiation emergencies. These arrangements are acceptable because they meet the requirements in 10 CFR Part 50, Appendix E, Section IV.E.5 and conform to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.12.3 *Offsite Medical Services*

Technical Information in the Emergency Plan: [L.1] {Appendix E, Section IV.E.7} Section II.L.1 of the Fermi 3 Emergency Plan states that written agreements are maintained with Mercy Memorial Hospital as a primary facility and Oakwood Southshore Medical Center as a backup facility for treating injured, contaminated, or overexposed Fermi 3 personnel. Both hospitals maintain emergency cabinets containing contamination control supplies and dosimeters and are adequately supplied and equipped to receive and treat contaminated patients. Activities are coordinated to ensure that these facilities maintain the support capabilities.

Technical Evaluation: [L.1] {Appendix E, Section IV.E.7} The staff finds that the Fermi 3 Emergency Plan adequately describes the arrangements for the services of physicians and other medical personnel qualified to handle onsite radiation emergencies. These arrangements are acceptable because they meet the requirements in 10 CFR Part 50, Appendix E, Section IV.E.7 and conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [L.4] {Appendix E, Section IV.E.6} Section II.L.3, "Medical Transportation," states that a local ambulance service (i.e., Monroe Community Ambulance) has agreed to provide transportation for injured and/or contaminated individuals from Fermi 3 on a 24-hour basis to an offsite medical facility. This commitment to provide transportation services is supported by a Letter of Certification, as listed in Appendix 2, "Certification Letters."

Technical Evaluation: [L.4] {Appendix E, Section IV.E.6} The staff finds that the Fermi 3 Emergency Plan adequately describes the arrangements to transport injured and/or

contaminated individuals from the Fermi 3 site to an offsite medical facility on a 24-hour basis is acceptable because the plan meets the requirements in 10 CFR Part 50, Appendix E, Section IV.E.6 and conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.12.4 *Conclusion*

The staff concludes that the information in the Fermi 3 Emergency Plan regarding medical and public health support is acceptable and meets the requirements of 10 CFR 50.47(b)(12) and 10 CFR Part 50, Appendix E, Sections IV.E.5, 6, and 7 and complies with the guidance in NUREG-0654/FEMA-REP-1, Revision 1, Planning Standard L.

13.3C.13 Recovery and Reentry Planning and Post-Accident Operations

13.3C.13.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(13), the staff evaluated the plan against the detailed evaluation criteria in NUREG–0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against applicable regulatory requirements related to the area of "Recovery and Reentry Planning and Post-Accident Operations" in Appendix E to 10 CFR Part 50.

13.3C.13.2 *Plans and Procedures for Reentry and Recovery*

Technical Information in the Emergency Plan: [M.1] {Appendix E, Section IV.H}
Section II.M, "Reentry and Recovery Planning," states that the EPIPs include detailed information describing the reentry and recovery activities. Section II.M.1.a, "Evaluating Reentry Conditions," states that reentry during the recovery phase of an accident will be performed using normal exposure limits. Either normal procedures or procedures that consider existing as well as potential conditions inside the affected areas will be developed specifically for each reentry. In RAI 13.03-13.01, the staff requested additional information regarding the procedures that have been developed. The applicant's response to RAI 13.03-13.01 dated December 7, 2009 (ADAMS Accession No. ML093440828), provides a revised Section II.M that states reentry and recovery activities are conducted in accordance with the EPIP entitled, "Recovery and Reentry," which is identified in Appendix 6 of the Emergency Plan. Section II.M.1.b, "Evaluating Entry into Recovery," states that a plan will be developed and coordinated with Federal, State, county, and provincial government officials. The recovery plan will include provisions for protecting public health and safety. Public officials will be kept aware of any impact the recovery plan may have on the responsibilities to the offsite public. There will also be periodic press briefings to inform the public of the progress regarding an emergency and periodic status reports to Detroit Edison employees and government and industry representatives. As low as is reasonably achievable (ALARA) principals will be used to manage radiation exposures to workers, and the size and make-up of the Recovery Organization will be adjusted as necessary. Section II.M.2, "Recovery Organization," states that before terminating an emergency and entering recovery, the following items at a minimum are to be considered:

- conditions that initiated the emergency classification are no longer applicable
- the potential for uncontrolled releases into the environment are under control or are no longer in excess of technical specification limits

- the radioactive plume has dissipated and plume tracking is no longer required
- environmental monitoring to assess the extent of the deposition only is required
- in-plant radiation levels are stable or are decreasing and are acceptable for existing plant conditions
- the reactor is shut down and stable
- long-term core cooling is available
- the containment pressure is within the technical specification limits
- the integrity of the primary containment was established
- all required offsite notifications were made
- discussions were held with Federal, State, county, and provincial government agencies
- an agreement was reached to terminate the emergency

Section II.M.1.a, "Evaluating Reentry Conditions," states that all reentry activities conducted during an emergency are authorized by the Emergency Coordinator and are coordinated with OSC personnel. In RAI 13.03-13.03, the staff requested the applicant to revise the Fermi 3 Emergency Plan to include a description of the Emergency Coordinator position and to revise Figure II.M-1, "Recovery Organization (Basic Frame Work)," to include the Emergency Coordinator position. The applicant's response to RAI 13.03-13.03 dated December 7, 2009 (ADAMS Accession No. ML093440828), the applicant provided a revised Section II.M.1 that correctly refers to the Emergency Officer position. The applicant stated that the Emergency Coordinator title is incorrect, and the title should refer to the Emergency Officer described in Section II.B of the Emergency Plan as the individual who authorizes reentry activities during the emergency phase of an accident.

Section II.M.2 states that decisions to relax protective actions for the public will be made in accordance with the State of Michigan Emergency Management Plan.

Technical Evaluation: [M.1] {Appendix E, Section IV.H} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-13.01 and 13.03-13.03 acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan the information and textual changes provided in the response to RAI 13.03-13.01 and 13.03-13.03. The staff finds that the Fermi 3 Emergency Plan adequately describes general plans and procedures for reentry and recovery. The plan also describes how decisions are reached to relax protective measures (e.g., allow reentry into an evacuated area). This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.H and conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.13.3 *Recovery Organization*

Technical Information in the Emergency Plan: [M.2] Section II.M.2 describes the recovery organization positions and responsibilities for the four key positions identified in Figure II.M-1. This section also briefly discusses additional support positions that may be needed, depending on the specific accident conditions. The Recovery Manager (Manager, Nuclear Outage

Management) directs the development of the recovery plan and procedures. The Nuclear Production Coordinator (Director of Nuclear Protection or a designated Alternate) develops the implementation and operating procedures to support the recovery efforts and authorizes the start of plant reentry activities. The Offsite Activities Coordinator is the liaison with offsite agencies and coordinates assistance for offsite recovery activities. A Public Information Coordinator is responsible for disseminating information about the recovery to the media and for coordinating with all public information groups. In RAI 13.03-13.02, the staff requested the applicant to clarify whether the JIC is the Public Information Coordinator. The applicant's response to RAI 13.03-13.02 dated December 7, 2009 (ADAMS Accession No. ML093440828), provided a revised Figure II.M-1 of the Emergency Plan that includes the position of "Public Information Coordinator."

Technical Evaluation: [M.2] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-13.02 acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-13.02. The staff finds that the Fermi 3 Emergency Plan contains an adequate description of the position title, authority, and responsibilities of individuals who will fill key positions in the facility recovery organization; and that the organization includes technical personnel with responsibilities to develop, evaluate, and direct recovery and reentry operations. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.13.4 *Recovery Operations Initiation*

Technical Information in the Emergency Plan: [M.3] Section II.M.1.b of the Fermi 3 Emergency Plan states that recovery plans will be developed by Detroit Edison and coordinated with Federal, State, county, and provincial government officials. The plans will include, among other topics, provisions for periodic status reports to be given to Detroit Edison employees and government and industry representatives; and provisions for necessary adjustments in the size and makeup of the Recovery Organization, as needed. Section II.M.2 describes the Recovery Manager as responsible for notifying offsite authorities in a timely manner that a recovery operation will be initiated. The Recovery Manager will also indicate any expected or potential offsite impact. The "Cross Reference of Fermi 3 Emergency Plan to Other Regulations and Regulatory Documents In Accordance with RG 1.206, Section C.I.13.3.1" identifies the corresponding State activities in the Michigan Emergency Management Plan (MEMP).

Technical Evaluation: [M.3] The staff finds that that the Fermi 3 Emergency Plan adequately addresses the means for informing members of the response organizations that a recovery operation is going to be initiated and of any changes in the organizational structure that may occur. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.13.5 *Methods to Estimate Total Population Exposure*

Technical Information in the Emergency Plan: [M.4] Section II.M.3, "Updating Total Population Exposure During Recovery Operations," of the Fermi 3 Emergency Plan describes a method that was developed to estimate the total population exposure due to an accident from data collected in cooperation with State and Federal agencies. Total population exposure is determined through a variety of procedures that include an examination of pre-positioned

environmental monitoring thermo luminescent dosimeters (TLDs); a bioassay; estimates based on release rates and meteorology; and estimates based on the environmental monitoring of food, water, and ambient dose rates. The State is the lead agency in collecting and analyzing environmental samples, and Fermi 3 environmental sampling activities will be coordinated with those of the State. The Fermi 3 Emergency Response Plan Supplemental Information document (Part 5, Revision 4 of the Fermi 3 COL application) titled, "Cross Reference of Fermi 3 Emergency Plan to Other Regulations and Regulatory Documents In Accordance with RG 1.206, Section C.I.13.3.1" identifies the corresponding State activities in the Disaster Specific Procedures Nuclear Power Plant Accident.

Technical Evaluation: [M.4] The staff finds that the Fermi 3 Emergency Plan adequately establishes a method for periodically estimating the total population exposure. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.13.6 *Conclusion*

The staff concludes that the information in the Fermi 3 Emergency Plan regarding recovery and reentry planning and post-accident operations is acceptable and meets the requirements of 10 CFR 50.47(b)(13) and 10 CFR Part 50, Appendix E, Section IV.H and complies with the guidance in NUREG-0654/FEMA-REP-1, Revision 1, Planning Standard M.

13.3C.14 Exercises and Drills

13.3C.14.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(14), the staff evaluated the plan against the detailed evaluation criteria in NUREG–0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against applicable regulatory requirements related to the area of "Exercises and Drills" in Appendix E to 10 CFR Part 50.

13.3C.14.2 *Emergency Preparedness Exercise Purpose and Content*

Technical Information in the Emergency Plan: [N.1.a] Section II.N.1, "Exercises," of the Fermi 3 Emergency Plan describes an exercise as an event that tests the integrated capability of a major portion of the basic elements in emergency preparedness plans and organizations. This section states that exercises are conducted in accordance with the NRC and FEMA rules in 10 CFR 50.47(b)(14) and 44 CFR 350.9.

Technical Evaluation: [N.1.a] The staff finds that the Fermi 3 Emergency Plan appropriately describes an exercise as a test of the integrated capability and the major elements of emergency plans and the preparedness program. In addition, the exercises will be conducted in accordance with the NRC and FEMA rules. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

Technical Information in the Emergency Plan: [N.1.b] Section II.N.1.b, "Exercise Scenarios and Participation," of the Fermi 3 Emergency Plan states that a full participation exercise will include appropriate State, county, and provincial authorities and Fermi 3 personnel actively taking part in testing the integrated capability to adequately assess and respond to a declared emergency at the plant. Section II.N.1.a, "Exercise Scope and Frequency," states that the

exercises vary so that all major elements of the plan and of the emergency organizations are tested within a 8-year period. One exercise shall start between 6:00 p.m. and 4:00 a.m. within a 8-year period. Exercises may be announced or unannounced and conducted under various weather conditions. Section II.N.4, "Exercise and Drill Evaluation," states that official observers from Federal, State, or local governments will observe, evaluate, and critique the required biennial exercise.

Technical Evaluation: [N.1.b] The staff finds that the Fermi 3 Emergency Plan describes a full participation exercise that includes the appropriate State, county, and provincial authorities and Fermi 3 personnel to test the integrated capability to adequately assess and respond to a declared emergency; and to vary the scenarios to ensure that all major elements of the plans and emergency organizations are tested within a 8-year period. In addition, at least one exercise scenario for a full participation exercise during an exercise cycle will begin between 6:00 p.m. and 4:00 a.m. and will be unannounced and conducted under various weather conditions. In all required biennial exercise evaluations the officials from Federal, State, or local governments will be able to observe, evaluate, and critique the performance. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.14.3 *Emergency Preparedness Exercises*

Technical Information in the Emergency Plan: {Appendix E, Section IV.F.2} Section II.N, "Exercises and Drills," of the Fermi 3 Emergency Plan states that exercises and drills are conducted to practice, test, and evaluate the adequacy of the Emergency Preparedness Program including facilities, equipment, procedures, communication links, actions of ERO personnel, and coordination between Fermi 3 and offsite emergency response organizations. Section II.E.5 states that the ANS is tested on a periodic basis that meets or exceeds FEMA guidance.

Technical Evaluation: {Appendix E, Section IV.F.2} The staff finds that the Fermi 3 Emergency Plan adequately describes emergency preparedness exercises that will test the adequacy of implementing procedures and methods of timing and content, emergency equipment and communications networks, and the public notification system and will ensure that emergency organization personnel are familiar with their duties. This description is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2.

13.3C.14.4 *Full Participation Exercise Before Fuel Load*

Technical Information in the Emergency Plan: {Appendix E, Section IV.F.2.a} Section II.N of the Fermi 3 Emergency Plan states that exercises and drills are conducted to practice, test, and evaluate the adequacy of the Emergency Preparedness Program including the facilities, equipment, procedures, communication links, actions of ERO personnel, and the coordination between Fermi 3 and offsite emergency response organizations. Section II.N.1.b states that full participation exercises will include the appropriate offsite State, county, and provincial authorities and Fermi 3 personnel to adequately assess and respond to an accident at the plant.

Technical Evaluation: {Appendix E, Section IV.F.2.a} The staff finds that the Fermi 3 Emergency Plan adequately describes the participation of exercises that will test as much of the licensee, State, and local emergency plans as is reasonably achievable, without mandatory public participation. This description is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2.a.

13.3C.14.5 *Onsite Biennial Exercise*

Technical Information in the Emergency Plan: {Appendix E, Section IV.F.2.b}
Section II.N.1.a of the Fermi 3 Emergency Plan states that an emergency (biennial) exercise will be conducted at least every 2 years and will vary so that all major elements of the plan and the emergency organizations will be tested within a 8-year period. Section II.N.1.b states that full participation exercises will include appropriate offsite State, county, and provincial authorities and Fermi 3 personnel to adequately assess and respond to an accident at the plant.
Section II.N.2, "Drills," states that drills are intended to test, develop, and maintain skills in a particular operation. Drills are conducted to ensure that adequate emergency response capabilities are maintained during the interval between the evaluated exercises.
Section II.N.2.f.2, "Additional Drills," states that during the interval between biennial exercises, at least one (1) "off year" drill should be conducted at the plant involving the principal areas of onsite emergency response capabilities. These areas include the management and coordination of emergency response, accident assessment, protective action decision making, and the repair and corrective action of plant systems.

Technical Evaluation: {Appendix E, Section IV.F.2.b} The staff finds that the Fermi 3 Emergency Plan adequately describes a drill and exercise program conducted to perform a Federally evaluated exercise every 2 years with additional drills and exercises to practice, test, and evaluate the adequacy of the Emergency Preparedness Program. The Program includes facilities, equipment, procedures, communication links, actions of ERO personnel, and coordination between Fermi 3 and offsite emergency response organizations to evaluate and correct deficiencies in any identified drill or exercise. Drills are conducted to ensure that adequate emergency response capabilities are maintained during the interval between evaluated exercises involving principal areas of onsite emergency response capabilities. These areas include the management and coordination of emergency response, accident assessment, protective action decision making, and plant system repair and corrective action. This description is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2.b.

13.3C.14.6 *Offsite Biennial Exercise*

Technical Information in the Emergency Plan: {Appendix E, Section IV.F.2.c}
Section II.N.1.b of the Fermi 3 Emergency Plan states that the MEMP delineates the frequency of State participation in an exercise with Detroit Edison. This participation may be either full or partial depending on the objectives of the exercise and the degree to which the state and local plans will be tested. Full participation exercises will include appropriate offsite State, county, and provincial authorities and Fermi 3 personnel to adequately assess and respond to an accident at the plant.

Technical Evaluation: {Appendix E, Section IV.F.2.c} The staff finds that the Fermi 3 Emergency Plan adequately describes full participation exercise scenarios performed at least biennially. These exercise scenarios provide opportunities for offsite authorities to have a role under the Fermi 3 Emergency Plan to exercise their plans. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2.c.

13.3C.14.7 *Ingestion Pathway Exercise with the State*

Technical Information in the Emergency Plan: {Appendix E, Section IV.F.2.d}
Section II.N.1.b of the Fermi 3 Emergency Plan states that Ingestion Pathway Exercises are conducted on a 6-year cycle, and Fermi 3 participates on a rotating basis with other fixed nuclear facilities in the State of Michigan. Ingestion Pathway Exercises are usually conducted in conjunction with a full participation exercise as the State chooses.

Technical Evaluation: {Appendix E, Section IV.F.2.d} The staff finds that the Fermi 3 Emergency Plan adequately describes how the licensee will coordinate with the State of Michigan on Ingestion Pathway Exercises. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2.d.

13.3C.14.8 *Enabling Local and State Participation in Drills*

Technical Information in the Emergency Plan: {Appendix E, Section IV.F.2.e}
Section II.N.2 of the Fermi 3 Emergency Plan describes the types and frequencies of drills and when appropriate, participation by outside organizations. Section II.N.2.e.2, "Additional Drills," states that routine offers to participate are made to offsite agencies in off-year drills.

Technical Evaluation: {Appendix E, Section IV.F.2.e} The staff finds that the Fermi 3 Emergency Plan adequately describes how the licensee enables State and local governments located within the plume exposure pathway EPZ to participate in the licensee's off-year drills. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2.e.

13.3C.14.9 *Remedial Exercises*

Technical Information in the Emergency Plan: {Appendix E, Section IV.F.2.f}
Section II.N.5, "Drill and Exercise Critiques," of the Fermi 3 Emergency Plan describes a critique and evaluation process that follows the exercises and drills The Supervisor of Emergency Preparedness is responsible for evaluating the recommendations and comments from the critique to ensure that corrective actions are implemented. In RAI 13.03-14.01, the staff requested the applicant to include details regarding remedial exercises in the Fermi 3 Emergency Plan. The applicant's response to RAI 13.03-14.01 dated December 7, 2009 (ADAMS Accession No. ML093440828), provided a revised Section II.N.5 of the Emergency Plan stating that a remedial exercise will be conducted in the event that implementation of the emergency plan is not satisfactorily demonstrated during a biennial exercise.

Technical Evaluation: {Appendix E, Section IV.F.2.f} The staff finds the additional information and a textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-14.01 acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2.f. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-14.01. The staff finds that the Fermi 3 Emergency Plan adequately describes how remedial exercises will be conducted if the emergency plan is not satisfactorily tested during the biennial exercise, so that the NRC and FEMA can finds reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2.f.

13.3C.14.10 *Drills*

Technical Information in the Emergency Plan: [N.2] {Appendix E, Section IV.E.8.c} Section II.N.2 of the Fermi 3 Emergency Plan states that drills are a supervised instruction period intended to test, develop, and maintain skills in a particular operation and are conducted to ensure that adequate emergency response capabilities are maintained during the interval between evaluated exercises. Section II.N.5 states that as soon as possible following the conclusion of each drill or exercise, a critique will be conducted to evaluate the ability of all participating organizations to respond. The Fermi 3 Emergency Preparedness Department will develop a formal written critique based on input from the drill participants, controllers/evaluators, and observers. The written critique will document the ability of the ERO to respond to the simulated emergency situation or sequence of events and may identify the need for changes to the Emergency Plan, procedures, equipment, facilities, or other components of the Emergency Preparedness Program. In RAI 13.03-98, the staff requested the applicant to revise the emergency response plan to perform consolidated EOF functions. In the response to RAI 13.3-98 dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant committed to revise the Emergency Plan to state:

> Prior to initial operation of the Fermi Emergency Operations Facility (EOF) and at least once each subsequent 8-year exercise cycle, a drill or exercise will be conducted that demonstrates the Fermi 2 and 3 Emergency Response Organizations (EROs) can perform the consolidated Fermi 2 and 3 EOF functions described in the emergency plans.

Technical Evaluation: [N.2] {Appendix E, Section IV.E.8.c} The staff finds that the additional information submitted in the response to RAI 13.03-98 is acceptable because it conforms to the guidance in NSIR/DPR-ISG-01, Section IV.I. The staff also finds that the Fermi 3 Emergency Plan adequately describes the drills as supervised instruction periods aimed at testing, developing, and maintaining skills in a particular operation and how each drill is evaluated. This change is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.E.8.c and conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1, and NSIR/DPR-ISG-01. Verification that a future revision of the COL application incorporates the applicant's proposed changes in RAI 13.03-98 was tracked as Confirmatory Item 13.03-83. The staff verified that the proposed changes in the RAI response are included in Part 5 to the COL application Revision 7. Therefore, Confirmatory Item 13.03-79 is resolved.

13.3C.14.11 *Communications Drills*

Technical Information in the Emergency Plan: [N.2.a] {Appendix E, Section IV.E.9(b)} Section II.N.2.a, "Communication Drills," of the Fermi 3 Emergency Plan states that communications with the CR, TSC, EOF, Michigan State Police, Monroe County Central Dispatch, and Wayne County Central Communications—as well as communications between the CR, TSC, and EOF and the NRC Headquarters Operations Center—will be tested monthly. Communications with the plant, State, and local emergency operation centers and the offsite RETs—as well as communication with the CR, TSC, OSC, EOF, and JPIC—will be tested annually. Annual drills conducted between the ERFs and participating organizations will include a confirmation of understanding of the content in the message. In RAI 13.03-14.02, the staff requested the applicant to verify that communications with Federal EROs and States within the ingestion pathway will be tested quarterly. The applicant's response to RAI 13.03-14.02 dated December 7, 2009 (ADAMS Accession No. ML093440828), states that testing the

communications from the CR, TSC, and EOF to NRC Headquarters and the NRC Region III Office Operations Center are conducted on a monthly basis. The applicant stated that because the NRC is the lead Federal agency for responding to emergencies at Fermi 3, NRC is therefore the only Federal agency with which communications are tested. The applicant also stated that under the conditions that require the implementation of the Fermi 3 Emergency Plan, communications are not established or maintained with the State of Ohio, which is the only State other than Michigan within the ingestion exposure pathway EPZ. Communications with the State of Ohio are established and tested in accordance with the plans of affected Federal and State authorities. In Supplemental RAI 13.03-16, the staff requested the applicant to describe the testing of communications with the State of Ohio, which is within the ingestion pathway and is consistent with NUREG–0654, Criterion N.2.a. The applicant's response to Supplemental RAI 13.03-16 dated June 25, 2010 (ADAMS Accession No. ML101790463) notes that the following will be added as item 6 to Section II.N.2.a:

> Communications with the State of Ohio is tested quarterly by the State of Michigan in accordance with the Disaster Specification Procedures of the Michigan Emergency Management Plant (MEMP) for Nuclear Power Plant Accidents (13.03-16).

The applicant provided a reference to the ingestion pathway testing from the "Disaster Specification Procedures," which state that "communications with Federal response agencies and States within the ingestion pathway are continuous, thereby being tested at least quarterly."

Technical Evaluation: [N.2.a] {Appendix E, Section IV.E.9(b)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAIs 13.03-14.02 and Supplemental RAI 13.03-16 acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan the information and textual changes provided in the response to RAIs 13.03-14.02 and Supplemental RAI 13.03-16. The staff finds that the Fermi 3 Emergency Plan adequately describes how communications with Federal, State, and local governments in the plume exposure pathway EPZ will be tested. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.E.9(b) and conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.14.12 *Fire Drills*

Technical Information in the Emergency Plan: [N.2.b] Section II.N.2.b, "Fire Drills," states that fire drills shall be conducted in accordance with Section 13.1 of the Fermi 3 FSAR and plant procedures. ESBWR DCD Tier 2, Subsection 9.5.1.15.4.5, "Fire Brigade Retraining," states that drills are performed at least once each calendar quarter for each shift fire brigade. Each fire brigade participates in at least two drills per year. Critiques are conducted upon completion of each drill. Drills include reviews of the latest plant modifications and corresponding changes in firefighting plans. Section II.N.2.b of the Fermi 3 Emergency Plan states that a fire drill involving the Frenchtown Fire Department is conducted annually.

Technical Evaluation: [N.2b] The staff finds the Fermi 3 Emergency Plan adequately describes how fire drills will be conducted in accordance with the Fermi 3 COL FSAR. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.14.13 *Medical Emergency Drills*

Technical Information in the Emergency Plan: [N.2.c] Section II.N.2.c, "Medical Emergency Drills," states that a medical emergency drill will be conducted annually involving a simulated contaminated individual and provisions for participation by the local support service agencies (i.e., ambulance and offsite medical treatment facility). In addition, the Emergency Plan describes that the offsite portions of the medical drill may be performed as part of the required biennial exercise.

Technical Evaluation: [N.2.c] The staff finds the Fermi 3 Emergency Plan adequately describes medical emergency drills involving a simulation of contaminated individuals and provisions for participation by local support organizations. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.14.14 *Radiological Monitoring Drills*

Technical Information in the Emergency Plan: [N.2.d] Section II.N.2.d, "Radiological Monitoring Drills," states that radiation monitoring drills will be conducted annually. These drills include collecting and analyzing sample media such as water, vegetation, and soil from the owner-controlled area or nearby offsite areas and provisions for communications and record keeping. Local organizations are routinely offered the opportunity to participate in the drill.

Technical Evaluation: [N.2.d] The staff finds the Fermi 3 Emergency Plan adequately describes plant environs and radiological monitoring drills (onsite and offsite) conducted annually, and local organizations are routinely offered the opportunity to participate. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.14.15 *Health Physics Drills*

Technical Information in the Emergency Plan: [N.2.e] Section II.N.2.e, "Radiation Protection Drills," states that drills involving the sampling and analysis of simulated elevated radioactive airborne and liquid samples, as well as direct radiation measurements in the plant environment, shall be conducted semi-annually.

Section II.N.2.e states that the simulated elevated radioactive liquid and airborne samples will be used in the drill. Information is needed regarding the analysis of in-plant liquid samples with actual elevated radiation levels in Health Physics drills, including the use of the post-accident sampling system. In RAI 13.03-14.03, the staff requested the applicant to provide details regarding the use of the post-accident sampling system. The applicant's response to RAI 13.03-14.03 dated December 7, 2009 (ADAMS Accession No. ML093440828) stated that the ESBWR design does not require a dedicated post-accident sampling system and the provided reference to the Topical Report NEDO-32991, "Regulatory Relaxation for BWR Post Accident Sampling Stations (PASS)," dated October 2000. The applicant also stated that processes for classifying fuel damage events utilize installed post-accident radiation monitoring instrumentation described in DCD Tier 2 Section 7.5, and the plant procedures contain instructions for obtaining grab samples using installed systems as addressed in FSAR Section 9.3. The applicant further stated that post-accident monitoring is adequate to implement the Emergency Plan without relying on the post-accident sampling capability. The applicant provides a revised Section II.N that omits Section II.N.2.e. The staff requested

additional information in RAI 13.03-81 regarding the frequency and content of the Health Physics drills. In the response to RAI 13.03-81 dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant provides a markup revision to the Fermi 3 Emergency Plan Section II.N to clarify radiation protection drills.

Technical Evaluation: [N.2.e] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan that were submitted in response to RAI 13.03-14.03 and RAI 13.03-81 acceptable because they conform to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporates the information and textual changes in the response to RAI 13.03-14.03 and RAI 13.03-81. The staff finds that the Fermi 3 Emergency Plan adequately describes how the health physics drills will be conducted semi-annually and will involve a response to an analysis of simulated elevated airborne and liquid samples and direct radiation measurements in the environment.

13.3C.14.16 *Conduct of Drills and Exercises*

Technical Information in the Emergency Plan: [N.3.a-f] Section II.N.3, "Conduct of Drills and Exercises," describes how drills and exercises will be carried out. Advance knowledge will be kept to a minimum to allow for "free play" decision making and to ensure realistic participation. Drill and exercise scenarios will include the basic objectives of each drill and exercise and appropriate evaluation criteria; date(s), time period, place(s), and participating organizations; the simulated events; and a time schedule of real and simulated initiating events. These scenarios also include a narrative summary describing the conduct of the exercises or drills to include elements such as simulated casualties, offsite fire department assistance, the rescue of personnel, the use of protective clothing, the deployment of emergency teams, public information activities; descriptions of assignments for qualified controllers/evaluators; and appropriate provisions for observers from Federal, State, and local organizations.

Technical Evaluation: [N.3.a-f] The staff finds that the Fermi 3 Emergency Plan adequately describes how exercises and drills will be carried out to allow free play for decision making and to meet the exercise objectives. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.14.17 *Observing, Evaluating, and Critiquing Drills and Exercises*

Technical Information in the Emergency Plan: [N.4] {Appendix E, Section IV.F.2(g)} Section II.N.4, "Exercise and Drill Evaluation," states that officials from Federal, State, or local governments will observe, evaluate, and critique the required biennial exercise in which the State and counties participate. Section II.N.5, "Drill and Exercise Critiques," states that a critique will be conducted as soon as possible following the conclusion of each drill and exercise, and the Fermi 3 Emergency Preparedness Department will develop a formal written critique that documents the ability of the ERO to respond to the simulated emergency.

Technical Evaluation: [N.4] {Appendix E, Section IV.F.2(g)} The staff finds that the Fermi 3 Emergency Plan adequately describes provisions for officials from Federal, State, or local governments to observe, evaluate, and critique the required exercises. The licensee will also critique the required drills or exercises as soon as possible following their completions. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Section IV.F.2(g) and the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.14.18 *Means to Correct Areas Needing Improvement*

Technical Information in the Emergency Plan: [N.5] Section II.N.5 states that the critique and evaluation process following an exercise or drill will be used to identify areas of the Emergency Preparedness Program that require improvement such as changes to the Emergency Plan, procedures, or other elements of the Emergency Preparedness Program. The Supervisor of Emergency Preparedness is responsible for evaluating recommendations and comments to ensure that corrective actions are implemented and to determine which items will be scheduled and tracked; the resolution will then be evaluated.

Technical Evaluation: [N.5] The staff finds that the Fermi 3 Emergency Plan adequately describes a means for evaluating observer and participant comments on areas in need of improvement, emergency plan procedural changes, assigning responsibility, implementing corrective actions, and establishing management controls to ensure that corrective actions are implemented. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.14.19 *Conclusion*

The staff concludes that the information in the Fermi 3 Emergency Plan regarding exercises and drills is acceptable and meets the requirements of 10 CFR 50.47(b)(14) and 10 CFR Part 50, Appendix E, Sections IV.E.9(b) and IV.F.2.(a) thru (g); and complies with the guidance in NUREG-0654/FEMA-REP-1, Revision 1, Planning Standard N.

13.3C.15 Radiological Emergency Training

13.3C.15.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(15), the staff evaluated the plan against the detailed evaluation criteria in NUREG–0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against applicable regulatory requirements related to the area of "Radiological Emergency Training" in Appendix E to 10 CFR Part 50.

13.3C.15.2 *Training for Offsite Emergency Organizations*

Technical Information in the Emergency Plan: [O.1.a] Section II.O, "Radiological Emergency Response Training," of the Fermi 3 Emergency Plan states that a training program will be implemented that provides for initial training and retraining for individuals with emergency response duties, including offsite support agencies that may be called on to assist in an emergency. Section II.O.1, "Offsite Emergency Response Training," states that the applicant will conduct or support site-specific training for offsite personnel who provide assistance during an emergency including local fire departments, law enforcement, ambulance, and hospital personnel. Additional training for offsite personnel is described in their respective radiological emergency plans with support provided by Fermi 3, when requested. Training topics include Radiological Emergency Response Plan orientation, communications interfaces, transporting and treating contaminated patients, basic health physics, and radiation protection. The applicant, the Michigan State Police, and the local counties will also develop a four-part training program to be presented annually to the local offsite ERO. This section also provides a list of participating organizations.

Technical Evaluation: [O.1.a] The staff finds that the Fermi 3 Emergency Plan adequately describes the site-specific emergency response training provided to offsite emergency organizations that may be called upon to provide assistance in the event of an emergency. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.3 *Onsite Emergency Response Organization Training*

Technical Information in the Emergency Plan: [O.2] Section II.O.2, "Onsite Emergency Response Training," of the Fermi 3 Emergency Plan states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and on position-specific responsibilities. The training program includes practical drills where individuals demonstrate the ability to perform their responsibilities and tasks. The instructor/evaluator immediately corrects any errors noted during the practical drills and demonstrates the correct practice. Section II.O.4, "Onsite Emergency Response Organization Training Program," states that knowledge-based training may be provided in a classroom or other setting described in the emergency plan administrative procedures. In addition, performance-based training and evaluations are conducted for most ERO members during drills, walk-throughs, or table-tops. The completion of training activities and evaluations is documented in the ERO qualification guides.

Technical Evaluation: [O.2] The staff finds that the Fermi 3 Emergency Plan adequately describes the training program for members of the onsite emergency organization that provides classroom training and practical drills that demonstrate the ability to perform assigned emergency functions. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.15.4 *First Aid and Rescue Team Training*

Technical Information in the Emergency Plan: [O.3] [O.4.f] {Appendix E, Section IV.F.1(b)(vi)} Section II.O.3, "First Aid Training," of the Fermi 3 Emergency Plan states that personnel responsible for providing first aid will complete a training course equivalent to the Red Cross "Multi-Media" course. In RAI 13.03-15.01, the staff requested additional information regarding the scope, nature, and frequency of specialized initial training and retraining. The applicant's response to RAI 13.03-15.01 dated December 7, 2009 (ADAMS Accession No. ML093440828), provides a revised Section II.O of the Fermi 3 Emergency Plan that describes the scope, nature, and frequency of specialized initial training and retraining provided to ERO personnel including first aid and rescue team personnel. This training is consistent with existing Nuclear Generation Selection, Training, and Qualification Program Description QP-ER-665, "Emergency Response Organization."

Technical Evaluation: [O.3] [O.4.f] {Appendix E, Section IV.F.1(b)(vi)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because the information conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes specialized initial and periodic retraining for individuals who may be called upon to provide first aid. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(vi), and the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.5 *Training Program to Implement the Emergency Plan*

Technical Information in the Emergency Plan: [O.4] {Appendix E, Section IV.F.1} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. The training program establishes the scope, nature, and frequency of the required training and qualification measures for facility position-specific emergency response members of the ERO. The content of the training program addresses the duties and responsibilities of the assigned position. Training is provided in a classroom or other setting as described in the emergency plan administrative procedures. Performance-based training and evaluations are conducted for most ERO members through drills, walk-throughs, or table-tops. The completion of training activities and evaluations are documented in ERO qualification guides. The lesson plans, study guides, and written exams are in the ERO training program. The initial and requalification training requirements are described in the emergency plan administrative procedures. Appendix 6 identifies the procedure for Radiological Emergency Response Training. Knowledge-based training may also be provided in a classroom setting.

In RAI 13.03-15.01, the staff requested additional information regarding the scope, nature, and frequency of the training specific to each of the following categories: personnel responsible for accident assessment; radiological monitoring teams and radiological analytical personnel; police, security, and firefighting personnel; repair and damage control/correctional action teams (onsite); first aid and rescue personnel; local support services personnel including Civil Defense/Emergency Service personnel; medical support personnel; licensee's headquarters support personnel; and personnel responsible for the transmission of emergency information and instructions. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828) provided a revised Section II.O of the Fermi 3 Emergency Plan that describes the scope, nature, and frequency of specialized initial training and retraining for ERO personnel. The training is consistent with existing Nuclear Generation Selection, Training, and Qualification Program Description QP-ER-665, "Emergency Response Organization." The applicant also described the scope, nature, and frequency of specialized initial training and retraining for the specific categories of personnel including ERO directors and coordinators; accident assessment personnel; radiological monitoring and analytical personnel; security and firefighting personnel; repair and damage control/corrective action team personnel; first aid and rescue team personnel; medical support personnel; Detroit Edison Headquarters support personnel; and personnel responsible for the transmission of emergency information and instructions.

Technical Evaluation: [O.4.] {Appendix E, Section IV.F.1} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because the information conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the training program for instructing and qualifying personnel who will implement radiological emergency response plans. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1, and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.15.6 *Training for Emergency Response Organization Directors*

Technical Information in the Emergency Plan: [O.4.a] {Appendix E, Section IV.F.1(b)(i)} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. ERO personnel are trained to the extent appropriate to their duties and responsibilities. A program will be implemented to provide facility position-specific emergency response training for designated members of the ERO. In RAI 13.03-15.01, the staff requested additional information on training specifically for ERO Directors. The applicant's response to RAI 13.03-15.01 dated December 7, 2009 (ADAMS Accession No. ML093440828), provides a revised Section II.O of the emergency plan that describes the scope, nature, and frequency of specialized initial training and retraining for ERO personnel. The training is consistent with existing Nuclear Generation Selection, Training, and Qualification Program Description QP-ER-665, "Emergency Response Organization."

Technical Evaluation: [O.4.a] {Appendix E, Section IV.F.1(b)(i)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because the information conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized initial and periodic retraining program for instructing and qualifying directors, managers, and coordinators who will implement radiological emergency response plans. This information is acceptable because it conforms to the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(i) and the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.15.7 *Training for Accident Assessment Personnel*

Technical Information in the Emergency Plan: [O.4.b] {Appendix E, Section IV.F.1(b)(ii)} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. A program will be implemented to provide facility position-specific emergency response training for designated members of the ERO. The training program establishes the scope, nature, and frequency of the required training and qualification measures. In RAI 13.03-15.01 the staff requested additional information regarding the scope, nature, and frequency of the training specifically for accident assessment personnel. The applicant's response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828) provided a revised Section II.O of the Emergency Plan that describes the scope, nature, and frequency of specialized initial training and retraining for ERO personnel. The training is consistent with existing Nuclear Generation Selection, Training, and Qualification Program Description QP-ER-665, "Emergency Response Organization."

Technical Evaluation: [O.4.b] {Appendix E, Section IV.F.1(b)(ii)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because the information conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized initial and periodic retraining for personnel responsible for accident assessment, including CR shift personnel. This information is acceptable because it meets the requirements

in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(ii) and conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.15.8 *Training for Radiological Monitoring and Analysis Personnel*

Technical Information in the Emergency Plan: [O.4.c] {Appendix E, Section IV.F.1(b)(iii)} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. A program will be implemented to provide facility position-specific emergency response training for designated members of the ERO that may include emergency exposure limits and exposure control techniques. In RAI 13.03-15.01, the staff requested additional information regarding the scope, nature, and frequency of the training specifically for radiological monitoring and analytical personnel. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828) provided a revised Section II.O of the Emergency Plan that describes the scope, nature, and frequency of specialized initial training and retraining for ERO personnel. The training is consistent with existing Nuclear Generation Selection, Training, and Qualification Program Description QP-ER-665, "Emergency Response Organization."

Technical Evaluation: [O.4.c] {Appendix E, Section IV.F.1(b)(iii)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because the information it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized initial and periodic retraining for radiological monitoring and analytical personnel. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(iii) and conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.9 *Training for Fire Fighting Teams*

Technical Information in the Emergency Plan: [O.4.d] {Appendix E, Section IV.F.1(b)(iv)} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. A program will be implemented to provide facility position-specific emergency response training for designated members of the ERO that may include security access control and the site evacuation process. In RAI 13.03-15.01, the staff requested additional information regarding the scope, nature, and frequency of the training specifically for firefighting teams. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828) provided a revised Section II.O of the Emergency Plan that describes the scope, nature, and frequency of specialized initial training and retraining for ERO personnel. The training is consistent with existing Nuclear Generation Selection, Training, and Qualification Program Description QP-ER-665, "Emergency Response Organization."

Technical Evaluation: [O.4.d] {Appendix E, Section IV.F.1(b)(iv)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes provided in the response to RAI 13.03-15-01. The staff concludes that the Fermi 3 Emergency Plan adequately describes

the specialized initial and periodic retraining for firefighting personnel. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(iv) and conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.10 *Training for Repair and Damage Control Teams*

Technical Information in the Emergency Plan: [O.4.e] {Appendix E, Section IV.F.1(b)(v)} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. A program will be implemented to provide facility position-specific emergency response training for designated members of the ERO that may include emergency response facilities. In RAI 13.03-15.01, the staff requested additional information regarding the scope, nature, and frequency of the repair and damage control teams training. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828) applicant provided a revised Section II.O.4, "Onsite Emergency Response Organization Training Program," that identifies training provided to repair and damage control/corrective action team personnel.

Technical Evaluation: [O.4.e] {Appendix E, Section IV.F.1(b)(v)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized initial and periodic retraining for repair and damage control teams. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(v) and conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.11 *Training for Local Emergency Management Personnel*

Technical Information in the Emergency Plan: [O.4.g] {Appendix E, Section IV.F.1} Section II.O.1 states that the applicant conducts or supports site-specific training for offsite personnel who provide assistance during an emergency. This section also states that the applicant conducts an annual seminar for offsite support personnel involved with the onsite/offsite emergency response facilities, EALs, emergency classification, meteorology, dose assessment, field surveys, and PARs. This section also provides a list of participating organizations.

Technical Evaluation: [O.4.g] {Appendix E, Section IV.F.1} The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized training and periodic retraining for local support services/emergency service personnel. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1 and conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.12 *Training for Medical Support Personnel*

Technical Information in the Emergency Plan: [O.4.h] {Appendix E, Section IV.F.1(b)(vii)} Section II.O.3 states that personnel assigned to emergency teams who provide first aid will complete a training course equivalent to the Red Cross Multi-Media Program on a schedule compatible with the Red Cross requirements. In RAI 13.03-15.01, the staff requested additional information regarding the scope, nature, and frequency of the training specifically for medical

support personnel. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828) the applicant provided a revised Section II.O of the Emergency Plan that describes the scope, nature, and frequency of specialized initial training and retraining for the ERO medical support personnel. The training is consistent with existing Nuclear Generation Selection, Training, and Qualification Program Description QP-ER-665, "Emergency Response Organization."

Technical Evaluation: [O.4.h] {Appendix E, Section IV.F.1(b)(vii)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized initial and periodic retraining for medical support personnel. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(vii) and conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.13 *Training for Headquarters Support Personnel*

Technical Information in the Emergency Plan: [O.4.i] {Appendix E, Section IV.F.1(b)(viii)} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. In RAI 13.03-15.01, the staff requested additional information regarding training for headquarters support personnel. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828) provided Section II.O.4, "Onsite Emergency Response Organization Training Program," stating that training is provided to Detroit Edison Headquarters support personnel. The content of the training program is appropriate for the duties and responsibilities of the assigned positions.

Technical Evaluation: [O.4.i] {Appendix E, Section IV.F.1(b)(viii)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized initial and periodic retraining for licensee's headquarters support personnel. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(viii) and conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.14 *Training Related to the Transmitting Emergency Information*

Technical Information in the Emergency Plan: [O.4.j] Section II.O.2 states that a program will be implemented to provide facility position-specific emergency response training for designated members of the ERO that may include emergency response facilities. In RAI 13.03-15.01, the staff requested additional information regarding the scope, nature, and frequency of the training for the personnel responsible for the transmission of emergency information and instructions. The applicant's response to this RAI dated December 7, 2009 (ADAMS Accession No. ML093440828) provided Section II.O.4 that identifies the training provided to personnel responsible for the transmission of emergency information and instructions.

Technical Evaluation: [O.4.j] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized initial and periodic retraining for personnel responsible for the transmission of emergency information and instructions. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.15.15 *Training for Security Personnel*

Technical Information in the Emergency Plan: {Appendix E, Section IV.F.1(b)(ix)} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. A program will be implemented to provide facility position-specific emergency response training for designated members of the ERO that may include emergency response facilities. In RAI 13.03-15.01, the staff requested additional information regarding the scope, nature, and frequency of the security personnel training. The applicant's response dated December 7, 2009 (ADAMS Accession No. ML093440828) provides a revised Section II.O.4, "Onsite Emergency Response Organization Training Program," that identifies training provided to security personnel.

Technical Evaluation: {Appendix E, Section IV.F.1(b)(ix)} The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-15.01 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes the specialized initial and periodic retraining for security personnel. This information is acceptable because it meets the requirements in 10 CFR Part 50, Appendix E, Section IV.F.1(b)(ix).

13.3C.15.16 *Retraining of Emergency Response Personnel*

Technical Information in the Emergency Plan: [O.5] {Appendix E, Section IV.F.1} Section II.O.2 states that all ERO personnel are initially trained and receive periodic retraining based on the requirements of 10 CFR Part 50, Appendix E and position-specific responsibilities. A program will be implemented to provide facility position-specific emergency response training for designated members of the ERO that may include emergency response facilities.

Technical Evaluation: [O.5] {Appendix E, Section IV.F.1} The staff finds that the Fermi 3 Emergency Plan adequately describes the provisions for retraining personnel with emergency response responsibilities. This information is acceptable because it meets the requirements of 10 CFR Part 50, Appendix E, Section IV.F.1 and conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.15.17 *Conclusion*

The staff concludes that the information in the Fermi 3 Emergency Plan regarding radiological emergency training is acceptable and meets the requirements of 10 CFR 50.47(b)(15);

10 CFR Part 50, Appendix E, Sections IV.F.1, IV.F1.b(i) through IV.F.1.b(ix) and complies with the guidance in NUREG-0654/FEMA-REP-1, Revision 1, Planning Standard O.

13.3C.16 Responsibility for the Planning Effort

13.3C.16.1 *Regulatory Basis*

In order to determine whether the proposed emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(16), the staff evaluated the plan against the detailed evaluation criteria in NUREG-0654/FEMA-REP-1, Revision 1. The staff also evaluated the proposed emergency plan against applicable regulatory requirements related to the area of "Responsibility for the Planning Effort" in Appendix E to 10 CFR Part 50.

13.3C.16.2 *Training for Personnel Responsible for Planning Effort*

Technical Information in the Emergency Plan: [P.1] Section II.P.1, "Training," of the Fermi 3 Emergency Plan states that Detroit Edison provides training for the Emergency Preparedness staff that is consistent with applicable regulatory requirements and guidance; license conditions; other commitments; and accepted good practices. Training includes formal education, professional seminars, plant-specific training, industry meetings, and other activities and forums that provide an exchange of pertinent information.

Technical Evaluation: [P.1] The staff finds that the Fermi 3 Emergency Plan adequately describes the training that will be provided for individuals responsible for the planning effort. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.16.3 *Person Responsible for Emergency Planning*

Technical Information in the Emergency Plan: [P.2] Section II.P.2, "Responsibility for the Planning Effort," of the Fermi 3 Emergency Plan identifies the Licensing Manager as the individual with overall authority and responsibility for emergency preparedness for the applicant. The Licensing Manager is also responsible for issuing and controlling the Fermi 3 Emergency Plan and activities associated with emergency preparedness.

Technical Evaluation: [P.2] The staff finds that the Fermi 3 Emergency Plan adequately identifies the individual, by title, with the overall authority and responsibility for radiological emergency response planning. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.16.4 *Designation of an Emergency Response Coordinator*

Technical Information in the Emergency Plan: [P.3] Section II.P, "Responsibility for the Planning Effort," states that the Supervisor reports to the Licensing Manager and is designated as the Emergency Planning Coordinator. Responsibilities include developing and updating the Emergency Plan and implementing and administering procedures that support the Emergency Plan. The Emergency Preparedness Supervisor also coordinates the development and revision of the Emergency Plan and procedures with other response organizations. The Licensing Manager is responsible for issuing and controlling the Emergency Plan.

Technical Evaluation: [P.3] The staff finds that the Fermi 3 Emergency Plan adequately designates an Emergency Planning Coordinator with the responsibility for developing and updating emergency plans and for coordinating these plans with other response organizations. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.16.5 *Update and Maintenance of the Emergency Plan*

Technical Information in the Emergency Plan: [P.4] {Appendix E, Section IV.G} Section II.P.3, "Responsibility for the Planning Effort," states that an annual review of the Emergency Plan is performed to ensure that the Emergency Plan and its supporting agreements are current. Changes to the emergency plan include issues identified during training, audits, assessments, drills, exercises, or actual emergency events.

Technical Evaluation: [P.4] {Appendix E, Section IV.G} The staff finds that the Fermi 3 Emergency Plan adequately describes provisions for updating the emergency plan and agreements and reviewing and certifying it to be current on an annual basis. In addition, the applicant described updating provisions take into account changes identified by drills and exercises. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1 and meets the applicable requirements in 10 CFR Part 50, Appendix E.

13.3C.16.6 *Distribution of Emergency Plans*

Technical Information in the Emergency Plan: [P.5] Section II.P.4, "Distribution of Revised Plans," states that revisions to the Emergency Plan are completed in accordance with the plant's review and approval processes. Revisions to the Emergency Plan are reviewed by affected organizations and then routed to the onsite review organization for review and approval. The plan and its implementing procedures are distributed as necessary on a controlled basis to the Emergency Response Facilities and selected State, local, provincial, and Federal agencies, in accordance with the plant's document control distribution process.

Technical Evaluation: [P.5] The staff finds that the Fermi 3 Emergency Plan adequately describes how the emergency response plans and approved changes will be forwarded to all organizations and appropriate individuals with responsibility for implementation of the Emergency Plan. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.16.7 *Supporting Plans*

Technical Information in the Emergency Plan: [P.6] Section II.P.5, "Supporting Plans," of the Fermi 3 Emergency Plan identifies the supporting plans from the State, county, and Federal governments, as well as from the NRC and the applicant.

Technical Evaluation: [P.6] The staff finds that the Fermi 3 Emergency Plan contains an appropriate detailed listing of supporting plans and their source. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.16.8 *Emergency Plan Implementing Procedures*

Technical Information in the Emergency Plan: [P.7] Section II.P.6, "Implementing and Supporting Procedures," states that Appendix 6 of the Fermi 3 Emergency Plan contains a listing by title of those procedures that implement and maintain the Emergency Plan. Appendix 6 also includes sections of the Emergency Plan and the corresponding implementing procedures.

Technical Evaluation: [P.7] The staff finds that the Fermi 3 Emergency Plan contains an Appendix with an appropriate listing of the procedures—by title—that are required to implement the Emergency Plan and their corresponding sections of the Emergency Plan that they implement. This Appendix is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.16.9 *Table of Contents and Cross-Reference Table*

Technical Information in the Emergency Plan: [P.8] Section II.P.7, "Table of Contents and Cross-Reference," states that the Fermi 3 Emergency Plan contains a specific table of contents and that the format of the Plan follows the format of NUREG–0654-FEMA-REP-1, Revision 1. Appendix 7, "NUREG–0654 Cross-Reference," of the Fermi 3 Emergency Plan provides a cross-reference between the Emergency Plan, Appendix E to 10 CFR Part 50, the evaluation criteria of NUREG–0654/FEMA-REP-1, and the State and local emergency plans.

Technical Evaluation: [P.8] The staff finds that the Fermi 3 Emergency Plan contains an adequate specific table of contents that cross-references applicable regulations and guidance documents to the supporting sections of Fermi 3 Emergency Response Plan. This is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.16.10 *Annual Independent Review of the Emergency Plan*

Technical Information in the Emergency Plan: [P.9] Section II.P.8, "Emergency Plan Audits," states that in order to meet the requirements of 10 CFR 50.54(t), periodic independent reviews of the Emergency Preparedness Program will be conducted to examine conformance with 10 CFR 50.47, 10 CFR 50.54, and 10 CFR Part 50, Appendix E. The Nuclear Quality Assurance organization will perform or oversee the independent audit and will coordinate with the Supervisor of Emergency Preparedness to ensure that audit findings and recommendations for improvement are subject to management controls that are consistent with the plant's corrective action program. The frequency of periodic audits is established and maintained based on an assessment of performance compared to performance indicators. However, the frequency of an audit may not be less than once every 24 months. In addition, program audits are conducted as soon as it is reasonably practicable after a change occurs in personnel, procedures, equipment, or facilities that has the potential to adversely affect emergency preparedness—but no longer than 12 months after the change.

In RAI 13.03-16-01, the staff requested the applicant to revise the emergency plan audit frequency description to be consistent with 10 CFR 50.54(t) (1) (ii) and not to exceed 24 months. The applicant's response to RAI 13.03-16-01 dated December 7, 2009 (ADAMS Accession No. ML093440828), provided a revised Section II.P.8 that clearly describes the intervals between audits and will include this revised information in a future revision to the emergency plan.

Technical Evaluation: [P.9] The staff finds the additional information and textual revision to the Fermi 3 Emergency Plan submitted in response to RAI 13.03-16-01 acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1. The staff confirmed that Revision 4 of the Fermi 3 Emergency Plan incorporated the information and textual changes in the response to RAI 13.03-15.01. The staff finds that the Fermi 3 Emergency Plan adequately describes arrangements for and the conduct of independent reviews of the Emergency Preparedness Program, at intervals not to exceed 12 months after a change that has the potential to adversely affect the site's emergency preparedness. This information is acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1.

13.3C.16.11 *Quarterly Update of Emergency Telephone Numbers*

Technical Information in the Emergency Plan: [P.10] Section II.P.9, "Emergency Telephone Numbers," states that the Emergency Preparedness Supervisor or designee is responsible for performing a quarterly review of telephone numbers in emergency response procedures and for ensuring that required updates are completed.

Technical Evaluation: [P.10] The staff finds that the Fermi 3 Emergency Plan adequately provides for updating telephone numbers in emergency procedures at least quarterly. This information is acceptable because it conforms to the guidance in NUREG–0654/FEMA-REP-1, Revision 1.

13.3C.16.12 *Conclusion*

The staff concludes that the information in the Fermi 3 Emergency Plan regarding the responsibility for the Emergency Plan is acceptable and meets the requirements of 10 CFR 50.47(b)(16) and 10 CFR Part 50, Appendix E, Section E.IV.G and complies with the guidance in NUREG-0654/FEMA-REP-1, Revision 1, Planning Standard P.

13.3C.17 Security-Based Event Considerations

13.3C.17.1 *Regulatory Basis*

NUREG-0800, Section 13.3, "Emergency Planning," specifies that applicants for a COL address the Commission Orders issued on February 25, 2002, as well as any subsequent NRC guidance, to determine what security-related aspects are to be addressed in the emergency plan.

The Commission Orders issued February 25, 2002, and security-related enhancements identified in NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events," identify the following areas to be addressed in the COL application, Emergency Plan, or EPIPs:

1. Security-based Emergency Classification Levels and EALs - The emergency plan includes EALs to ensure that a site specific, security event results in an emergency classification declaration of at least a notification of unusual event. The classification scheme should also reflect the strategy for escalation to a higher level event classification.

2. NRC Notifications - Notification procedures allow for NRC notification of safeguard events immediately after notification of local law enforcement agencies (LLEAs), or within about 15 minutes of the recognition of a security-based threat.
3. Onsite Protective Measures - Consideration has been given to a range of protective measures for site workers, as appropriate, during a security-based event (e.g., evacuation of personnel from target buildings, site evacuation by opening security gates, dispersal of licensed operators, sheltering of personnel in structures away from potential site targets, and arrangements for accounting for personnel after attack).
4. ERO Augmentation - ERFs and alternative facilities have been identified to support the rapid response from ERO members to mitigate site damage from a security-based event once the site is secured. The alternative facilities could likely be located outside of the PA and should include the following characteristics: accessible even if the site is under threat or actual attack; communication links with the EOF, CR and plant security; the capability to perform offsite notifications; and the capability for engineering assessment activities, including damage control team planning and preparation. The alternative facility should also be equipped with general plant drawings and procedures, telephones, and computer links to the site.
5. Potential Vulnerabilities from Nearby Hazardous Facilities, Dams, and other Sites - The potential effect has been determined on the plant, onsite staffing and augmentation, and onsite evacuation strategies from damage to nearby hazardous facilities, dams, and other nearby sites, in consideration of a security-based event.
6. Drills and Exercises - Emergency Preparedness drill and exercise programs maintain the key skills necessary for mitigating security-based events. The ERO demonstrates security-based emergency preparedness program activities under the schedule as committed to in its emergency plans.
7. Emergency Preparedness and Response to a Security-based Event - Onsite staffing, facilities, and procedures are adequate to accomplish actions necessary to respond to a security-based event, and the emergency plan and/or procedures reflect the site specific needs.

13.3C.17.2 *Security-Based Emergency Classification and Emergency Action Levels*

Technical Information in the Emergency Plan: (NUREG-0800) Emergency classifications for security or a hostile action based on event information are included in the EALs addressed in Section 13.3C.4 of this SER.

Technical Evaluation: (NUREG-0800) The staff's evaluation is also in Section 13.3C.4 of this SER.

13.3C.17.3 *NRC Notification*

Technical Information in the Emergency Plan: (NUREG-0800) NRC notification information is in Subsection 13.3C.5.8 of this SER.

Technical Evaluation: (NUREG-0800) The staff's evaluation is also in Subsection 13.3C.5.8 of this SER.

13.3C.17.4 *Onsite Protective Measures*

Technical Information in the Emergency Plan: (NUREG-0800) Section II.J.6 of the Fermi 3 Emergency Plan addresses security measures for a hostile action event at the site. This section describes conditions that initiate hostile action event protective actions for the site other than personnel assembly, accountability, and evacuation—the expected protective actions for a radiological event. Specifically during a security event, the Emergency Director coordinates with Nuclear Security to make decisions regarding the appropriate protective actions for site personnel. If, in the Emergency Director's judgment, personnel assembly, accountability, and evacuation would not be the safest protective actions for site personnel, he or she may direct protective measures such as:

- Evacuation of personnel from areas and buildings perceived as high-value targets
- Site evacuation by opening, while continuing to defend, security gates
- Dispersal of key personnel
- Onsite sheltering
- Staging of ERO personnel in alternate locations pending the restoration of safe conditions
- Implementation of accountability measures following the restoration of safe conditions

Technical Evaluation: (NUREG-0800) The staff finds the Fermi 3 Emergency Plan adequately describes onsite protective measures necessary to respond to a security event. This information is acceptable because it meets the guidance in NUREG–0800.

13.3C.17.5 *Emergency Response Organization Augmentation*

Technical Information in the Emergency Plan: (NUREG-0800) ERO augmentation is addressed in Section II.A.1 under "Coordination with Fermi 2." This section states that in the event that emergencies are declared simultaneously at Fermi 2 and 3, a single Emergency Director is designated from onsite shift management in accordance with the EPIPs. The Emergency Director performs those duties described in the Fermi 3 Emergency Plan, as well as those described in the Fermi 2 Emergency Plan, and coordinates activities between the TSCs and OSCs. Section II.B.1, Tables II.B-1, II.B-2 and II.B-4 address ERO command and control, ERO minimum staffing, and position functions/tasks. Section II.E.1 describes the processes and procedures for ERO notification and mobilization. Section II.J.5 states that personnel accountability is performed in accordance with EPIPs consistent with the requirements of the Fermi 3 Security Plan. Section II.J.6 states that during a security event, conditions may dictate the initiation of protective measures other than personnel evacuation, assembly, and accountability. The Emergency Director makes decisions regarding appropriate protective measures based on an evaluation of site conditions, including input from security. The Emergency Director may direct other protective measures if personnel evacuation, assembly, and accountability may result in undue hazards to site personnel.

Technical Evaluation: (NUREG-0800) The staff finds that the Fermi 3 Emergency Plan adequately describes the ERO augmentation necessary to respond to a security event. This information is acceptable because it meets the guidance in NUREG–0800.

13.3C.17.6 *Potential Vulnerabilities from Nearby Hazardous Facilities, Dams, and Other Sites*

Technical Information in the Emergency Plan: (NUREG-0800) The assessment of potential vulnerabilities from nearby hazardous facilities, dams, and other sites that could potentially affect the safety of the Fermi 3 facility is addressed in COL FSAR Section 2.2, "Nearby Industrial, Transportation, and Military Facilities." FSAR Section 2.2.1, "Locations and Routes," states that there are no chemical plants, refineries, mining operations, drilling operations, active oil or gas wells, military bases, or missile sites within the vicinity of Fermi 3. Section 2.2.3, "Evaluation of Potential Accidents," states that the separation between the: interstates, main railway line, and waterway routes and the Fermi site are within the safe distance criteria of RG 1.91, Revision 1, "Evaluations of Explosions Postulated to Occur at Transportation Routes Near Nuclear Power Plants."

Technical Evaluation: (NUREG-0800) The staff finds the Fermi 3 Emergency Plan adequately describes the assessment of other nearby hazards that could potentially affect the safety of the Fermi 3 facility. This information is acceptable because it meets the guidance in NUREG-0800.

13.3C.17.7 *Security-Based Drills and Exercises*

Technical Information in the Emergency Plan: (NUREG-0800) Section II.N.1.b of the Fermi 3 Emergency Plan addresses the performance of security-based drills and exercises. This section states that the applicant will demonstrate emergency response capability to a security-based threat at least once within a 8-year period.

Technical Evaluation: (NUREG-0800) The staff finds the Fermi 3 Emergency Plan adequately describes the security-based drill and exercise program. This information is acceptable because it meets the guidance in NUREG–0800.

13.3C.17.8 *Emergency Preparedness and Response to a Security-Based Event*

Onsite staffing, facilities, and procedures are adequate to accomplish actions necessary to respond to a security-based event, and the emergency plan and/or procedures reflect the site-specific needs.

Technical Information in the Emergency Plan: (NUREG-0800) Emergency Preparedness and Response to a security-based event information is described in Sections 13.3C.2, 13.3C.8, and 13.3C.10 of this SER.

Technical Evaluation: (NUREG-0800) The staff's evaluation is also in Sections 13.3C.2, 13.3C.8, and 13.3C.10 of this SER. This information is acceptable because it meets the guidance in NUREG–0800.

13.3C.17.9 *Conclusion*

The staff concludes that the Fermi 3 Emergency Plan adequately addresses the preparation for and response to a security-based events program. This information is acceptable because it meets the guidance in NUREG–0800.

13.3C.18 Evacuation Time Estimate (ETE) Analysis

The Fermi 3 Emergency Plan includes an analysis of the time required to evacuate the plume exposure pathway EPZ. The report titled, "Fermi Nuclear Power Plant Development of Evacuation Time Estimates," Revision 2, dated April 2010 (ETE Report) was provided as a separate document in the COL application. The report includes analyses of and responses to RAIs dated October 14, 2009 (ADAMS Accession No. ML092931167), which provided the basis for the NRC staff's conclusions as to the adequacy of its content and conformity with Appendix 4, "Evacuation Time Estimates within the Plume Exposure Pathway Emergency Planning Zone," to NUREG-0654/FEMA REP-1, Revision 1.

13.3C.18.1 *Regulatory Basis for the ETE Analysis*

The staff considered the following regulatory requirements and guidance in the review of the evacuation time estimate analysis:

10 CFR 52.79(a)(21) refers to 10 CFR Part 50, Appendix E, Section IV, which requires, in part, that the nuclear power reactor operating license applicant provide an analysis of the time required to evacuate various sectors and the distances within the plume exposure pathway EPZ for transient and permanent populations.

The staff evaluated the ETE Report against Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1. Appendix 4 contains detailed guidance that the staff used to determine whether the ETE analysis meets the applicable regulatory requirements in Appendix E to 10 CFR Part 50.

13.3C.18.2 *Introductory Materials Related to the ETE Report*

Technical Information in the ETE Report: [Section I of Appendix 4] Section 1.2, "The Fermi Nuclear Power Plant Location," of the ETE Report describes the Fermi 3 site as located on the west bank of Lake Erie, approximately 38 km (24 mi) northeast of Toledo, Ohio, and 48 km (30 mi) southwest of Detroit, Michigan. The EPZ consists of parts of Monroe and Wayne Counties. A vicinity map is provided as Figure 1-1, "Fermi Nuclear Power Plant Location Site Location," which shows the plant location, EPZ boundary, and topographical features including Lake Erie to the east of the site, inland waterways, major interstate highways, state roadways, and railroad tracks within the EPZ. Appendix L, "Protective Action Area Boundaries," describes the boundaries of the five protective action areas, which are generally distinguished by roadways. In RAI 13.03-1, the staff requested the applicant to provide a map of the EPZ that identifies political boundaries. In the response to RAI 13.03-1 dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised Figure 6-1, "Fermi Nuclear Power Plant Protective Action Areas," to include political boundaries and to reference the political boundaries in the text.

Section 1, "Introduction," describes the approach used to develop information and analyze the evacuation times. The applicant gathered demographic information, performed a field survey of

the EPZ, estimated trip generation times, defined evacuation regions, applied the procedures specified in the Transportation Research Board 2000 Highway Capacity Manual (TRB 2000), modeled the evacuation, and calculated the ETE. Section 1.3, "Preliminary Activities," states that the IDYNEV system was used in the analysis and includes PC-DYNEV, which is a macroscopic traffic simulation model used to calculate the ETE. Section 1 identifies NUREG/CR–4873, "Benchmark Study of the IDYNEV Evacuation Time Estimate Computer Code," and NUREG/CR–4874, "The Sensitivity of Evacuation Time Estimates to Changes in Input Parameters for the IDYNEV Computer Code," as references for additional detail regarding the model. Appendix B, "Traffic Assignment Model," describes the trip assignment and distribution model and provides the algorithm used to compute the link travel time. The algorithm was based on the Bureau of Public Roads formula. Appendix C, "Traffic Simulation Model: PC-DYNEV," describes the method and computer model used to analyze the evacuation times. Appendix C includes a description of histograms developed and used in the analysis.

Section 2.1, "Data Estimates," describes how population estimates were developed and states that roadway capacities were based on field surveys and the application of the 2000 Highway Capacity Manual guidance (TRB, 2000).

Section 2.2, "Study Methodological Assumptions," describes assumptions for data estimates, methodology, the planning basis, school evacuations, mobilization of the general population, percentage of households with commuters, and staffing the traffic control. The ETE is assumed to be the time from the advisory to evacuate until the time that the Region is clear of the indicated percentile of people. Evacuation movements are assumed to be outbound with regard to the plant site. Assumptions regarding shadow evacuations are provided and are consistent with the guidance in NUREG/CR–6863.

Section 2.3, "Study Assumptions," provides assumptions for data estimates, methodology, planning basis, school evacuations, mobilization of the general population, percentage of households with commuters, and staffing the traffic control. Section 2.3 describes roadway capacity and speed reduction percentages that are consistent with the values in the Highway Capacity Manual (TRB, 2000) and in the weather-related technical publication "Impacts of Weather on Urban Freeway Traffic Flow Characteristics and Facility Capacity," (Agarwal et al., 2005), which is identified in the ETE Report. Section 2.3 describes a planning assumption that 64 percent of households with commuters will wait for the return of a commuter before beginning their evacuation trip. In RAI 13.03-2, the staff noted a discrepancy between the 64 percent of households awaiting the return of a commuter and the 55 percent waiting for a family member to return before evacuating. In the response to RAI 13.03-2 dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that the text for Assumption 3b would be revised to show the correct value of 62 percent. The applicant revised text for Assumption 3b in Section 2.3. In RAI 13.03-36 the staff requested the applicant to revise all applicable sections of the ETE Report to reflect the revised assumption that all households with commuters will await the return of the commuter prior to evacuating. In the response to RAI 13.03-36 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant revised Section 8.1 and Table 8-1 to reflect that all commuters will return home. The applicant's additional text in Appendix F, "Telephone Survey," states the following:

> This data was not used in this study. The findings of NUREG/CR-6953, Volume 2 indicate that the family tends to evacuate together. Based on this information, it is assumed for this study that 100 percent of households with at least one commuter (62% of EPZ households according to Figure F-6) await the return of the commuter before beginning their evacuation trip.

In the response the applicant revised Table 6-4, "Vehicle Estimates by Scenario," to reflect the changes in the buses and total vehicles as a result of the change regarding commuters.

In RAI 13.03-52, the staff requested the applicant to explain why the distributions that include commuters in Section 5, "Estimation of Trip Generation Time," such as Figure 5-3, "Comparison of Trip Generation Distributions," and Table 5-1, "Trip Generation Histograms for the EPZ Population," remain unchanged, and if they require change, revise the distributions and text references regarding commuters, as appropriate. In the response to RAI 13.03-52 dated August 13, 2010 (ADAMS Accession No. ML102290043), the applicant stated that because households with and without commuters exist within the EPZ, separate distributions for "households with commuters" and "households without commuters" are appropriate. Additionally, the applicant will remove all references to "households not awaiting commuters" in the ETE report. The applicant will revise Table 1-1, "ETE Study Comparisons," Section 5 and Table 6-3, "Percent of Population Groups Evacuating for Various Scenarios."

Technical Evaluation: [Section I of Appendix 4] The ETE Report includes a map showing the proposed site and plume exposure pathway EPZ, as well as transportation networks, topographical features, and political boundaries. The boundaries of the EPZ, in addition to the evacuation subareas within the EPZ, are based on factors such as current and projected demography, topography, land characteristics, access routes, and jurisdictional boundaries.

The ETE Report describes the method used to analyze the evacuation times. A general description of the evacuation model was provided, including the assumptions used in the evacuation time estimate analysis.

In the response to RAI 13.03-1 dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised Figure 6-1, "Fermi Nuclear Power Plant Protective Action Areas," to show PAAs and national, county, and township boundaries. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-1 that clarified the textual information concerning the plant location in relation to transportation networks, topographical features, and political boundaries acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1, Appendix 4, Section I.A. The staff confirmed that Revision 1 of the Fermi Nuclear Power Plant (NPP) ETE incorporated the information and textual changes provided in the response to RAI 13.03-01.

In the response to RAI 13.03-2 dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised Assumption 3b to state that all households in the EPZ with commuters will await the return of the commuter before beginning their evacuation. In the response to RAI 13.03-36 dated April 16, 2010 (ADAMS Accession No. ML101190369) the applicant revised the number of transit-dependent persons and the number of vehicles used in the evacuation. In the response to RAI 13.03-52 dated August 13, 2010 (ADAMS Accession No. ML102290043), the applicant removed references to "households not awaiting commuters" and revised Table 1-1, Section 5, and Table 6-3. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-2 and RAIs 13.03-36 and 13.03-52 clarifying the

textual information concerning assumptions used for households in the EPZ with commuters acceptable because it conforms to the guidance in NUREG-0654/FEMA-REP-1, Revision 1 Appendix 4, Section I.B.

13.3C.18.3 *Demand Estimation*

Technical Information in the ETE Report: [Section II of Appendix 4] Population estimates in the ETE were based on data from the 2000 U.S. Census and projected to the year 2008 using census growth rate projections. For the new plant construction scenario, the permanent resident and shadow populations were projected to the year 2018. In Table 3-2, "EPZ Permanent Resident Population," the 2000 population is 92,699 from which the 2008 population is projected. Table 3-2 of the ETE includes a footnote explaining that the 16-km (10-mi) boundary, as opposed to the EPZ boundary, is used in other COL application locations that lead to deviations in population estimates. The year 2000 population in the Detroit Edison Energy Environmental Report (ER) Section 2.5.1, "Demography," and FSAR Subsection 2.1.3.1.2.1, "Transient Population," is 89,198 based on a 16-km (10-mi) boundary rather than the EPZ boundary.

Section 3, "Demand Estimation," quantifies the permanent residents, transients, and employees within the EPZ and includes peak populations for the River Raisin Jazz Festival special event; peak construction workforce; and visitors to parks, golf courses, marinas, and major retail facilities. Table 3-3, "Permanent Resident Population and Vehicles by PAA," identifies a population of 103,343 and 47,113 vehicles that corresponds to an automobile occupancy factor of 2.2 people per vehicle (103,343/47,113). Table 8-1, "Transit Dependent Population Estimates," identifies 2,986 people as transit dependent. In RAI 13.03-4, the staff asked for the number of transit-dependent residents who may have special needs. In the response to RAI 13.03-4 dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant describes the approach for estimating the number of transit-dependent residents and demonstrates that the evacuation of this population group may be conducted within the ETE for the general public. The applicant added Section 8.5, "Evacuation of Homebound Special Needs Population," to the ETE Report. In RAI 13.03-37, the staff asked whether vans are used to evacuate special needs individuals who are also transit dependent and if so, to provide the number and capacity of buses and vans available for the evacuation. In the response to RAI 13.03-37 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant stated that based on discussions with emergency management personnel from Monroe and Wayne Counties, regular buses and specially equipped buses will be used to service wheelchair-bound residents within the EPZ. The applicant also provided the number of available buses in Monroe and Wayne Counties as well as in Toledo, Ohio. The applicant assumed that 50 percent of wheelchairs are rigid and 50 percent of wheelchairs are folding. Those wheelchair-bound persons using folding wheelchairs can be evacuated in a standard bus and their wheelchairs can be folded and placed elsewhere in the bus. Wheelchair-bound persons using rigid wheelchairs will be evacuated in specially equipped buses. The response describes regular buses that have a capacity of 7 persons with folding wheelchairs and 7 caretakers; and specially equipped buses with a capacity of 4 persons in rigid wheelchairs and 4 caretakers.

Table 3-4, "Transient Population and Vehicles by PAA," lists a total of 13,458 transients in the EPZ and 6,405 vehicles that corresponds to a vehicle occupancy factor of 2.1 persons per vehicle (13,458/6,405). Appendix E, "Special Facility Data," includes a table entitled, "Fermi EPZ: Major Employers," that identifies a total of 13,952 maximum-shift employees within the EPZ; 5,047 are identified as commuting employees. In RAI 13.03-5 (A, B), the staff asked

about the differences in transient population values in Appendix E and Table 2.1-213 of the Fermi 3 FSAR. In the response to RAI 13.03-5 (A, B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant provided an updated Table E-3, "Major Employers within the Fermi EPZ," which correctly identifies the percentage and number of employees commuting into the EPZ, total employees, and the number of employees in the maximum shift. The applicant compared the updated totals with the FSAR values and stated that the employee numbers in the ETE and FSAR are in good agreement. The automobile occupancy factor for employees who commute into the EPZ is developed separately and is estimated at one person per vehicle.

Section 8, "Transit Dependent and Special Facility Evacuation Time Estimates," describes the estimate of the special facility population that is provided on an institution-by-institution basis and the mobilization and manpower needed to support an evacuation of special facilities. Weather conditions and current facility populations are considered along with ambulatory and non-ambulatory needs. In RAI 13.03-6 (A), the staff asked for the number of transportation resources needed if peak populations at special facilities were used. In the response to RAI 13.03-6 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that no additional vehicle resources will be needed to support the evacuation of special facilities at full capacity, because reserve capacity in the planned vehicles can cover the difference in the population.

A listing of the schools located within the EPZ, including the student population and the number of bus runs required to support an evacuation, is in Table 8-2 (A and B) for Monroe and Wayne County Schools. Section 8.2, "School Population – Transit Demand," identifies the bus capacity for primary schools as 70 students. Section 8.4, "Evacuation time Estimates for Transit Dependent People," states that available bus resources are sufficient in each county to service the school evacuation demand in a single wave assuming that drivers are available for all vehicles. Additional information was requested in RAI 13.03-6 (B and C) regarding the number of buses required to support an evacuation of schools and the availability of drivers. In the response to RAI 13.03-6 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant identified that 383 buses are needed to evacuate schools when considering a maximum of 70 students per bus. The applicant will revise Table 8-2A, "Monroe County Schools," to show that 271 bus runs are needed; and Table 8-2B, "Wayne County Schools," to show that 112 bus runs are needed for a total of 383 bus runs. In the response to RAI 13.03-6 (C) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that emergency plans were reviewed and county officials confirmed that 383 buses and drivers are available to support a single-wave evacuation of schools.

Figure 3-1, "FNPP Permanent Resident Population by PAA," describes the PAAs that cover the EPZ. Table 7-2, "Description of Evacuation Regions," identifies the PAAs that are included in each region for which an ETE is developed. Region R01 is the 3.2-km (2-mi) ring, R02 is the 8-km (5-mi) ring, and R03 is the full EPZ. Table 7-1D, "Time to Clear the Indicated Area of 100 Percent of the Evacuating Population," provides ETEs for the 3.2-km (2-mi) zone, 8-km (5-mi) zone, the full EPZ, and for multiple wind directions around the plant.

Technical Evaluation: [Section II of Appendix 4] The ETE Report provides an estimate of the number of people who may need to evacuate. Three population segments are considered: permanent residents, transients, and persons in special facilities. The permanent population is adjusted for growth, and the population data are translated into two groups: those using automobiles and those without automobiles. The number of vehicles used by permanent

residents is estimated using an appropriate automobile occupancy factor. In addition, evacuation time estimates for the simultaneous evacuation of the entire plume exposure pathway EPZ were determined.

Estimates of transient populations are developed using local data, including peak tourist volumes and employment data. Estimates for special facility populations are also provided.

The subareas for which evacuation time estimates were determined, encompass the entire area within the plume exposure EPZ. The maps are adequate for that purpose, and the level of detail is approximately the same as the USGS quadrant maps contain.

In the response to RAI 13.03-6 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that no additional vehicle resources will be needed to support an evacuation of special facilities at full capacity, because reserve capacity in the planned vehicles can cover the potential difference in population. The staff finds the applicant's response acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section II.C.

In the response to RAI 13.03-5 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised values entered for "Total Employees" and "Max Shift" in Table E-3 to correct the values. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-5 (A) that corrected the textual information concerning estimates of transient populations in the EPZ acceptable, because they conform to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section II.B. The staff confirmed that Revision 1 of the ETE Report incorporated the information and textual changes in the response to RAI 13.03-5(A).

In the response to RAI 13.03-5 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised Table E-3 to show 450 employees at the Meijer Distribution Center and 232 employees at TWB Company, LLC. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-5 (B) that corrected the textual information concerning estimates of transient populations in the EPZ acceptable, because they conform to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section II.B. The staff confirmed that Revision 1 of the ETE Report incorporated the information and textual changes in the response to RAI 13.03-5(B).

In the response to RAI 13.03-6 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised school bus totals for the evacuation of North Elementary School, Raisinville Elementary School, Chapman Elementary School, David Oren Hunter Elementary School, John M. Barnes Elementary School, and Cantrick Middle School in Table 8-2A, "Monroe County Schools," Table 8-2B, "Wayne County Schools," and in the supporting text. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-6 (B) that corrected the textual information concerning school bus totals needed for the evacuation acceptable, because it conforms to the guidance in Appendix 4 to NUREG-0654, Section II.C. The staff confirmed that Revision 2 of the Fermi NPP ETE Report incorporated the information and textual changes in the response to RAI 13.03-6 (B).

In the response to RAI 13.03-6 (C) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant added information stating that there are a sufficient number of school buses and drivers in Monroe and Wayne Counties to evacuate schools in a single wave.

The staff finds the additional information and textual revisions submitted in response to RAI 13.03-6 (C) that added information stating that the number of bus drivers is confirmed, and there are enough bus drivers to support a single-wave evacuation is acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section II.C. The staff confirmed that Revision 2 of the Fermi NPP ETE Report incorporated the information and textual changes in the response to RAI 13.03-6 (C).

In the response to RAI 13.03-4 dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant described the use of both bus and van service for wheelchair-bound residents. In RAI 13.03-37, the staff requested the applicant to clarify whether vans are used and if so, to identify the number and capacity of buses and vans for the evacuation of special needs individuals who are also transit dependent. In the response to RAI 13.03-37 dated April 16, 2010 (ADAMS Accession No. ML101190369) the applicant revised the ETE to describe the number of standard buses and specially equipped buses for evacuating special facilities as well as special needs persons who are also transit dependent. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-4 and RAI 13.03-37 that clarified the textual information concerning the types of vehicles needed to evacuate special facility populations acceptable, because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section II.C. The staff confirmed that Revision 2 of the Fermi NPP ETE Report incorporates the information and textual changes in the response to RAI 13.03-6 (C).

13.3C.18.4 *Traffic Capacity*

Technical Information in the ETE Report: [Section III of Appendix 4] Figure 10-1, "Fermi Nuclear Power Plant Reception Centers and Host Schools," shows the locations of host schools and reception centers. Figures 10-2, "Evacuation Routes for PAA 1, 3 and 5," and 10-3, "Evacuation Routes for PAA 2 and 4," identifies the roadway network and evacuation routes used in the analysis. The evacuation routes are outbound and are generally away from the plant.

Appendix C describes the method and computer model used to analyze the evacuation times. Appendix B provides a discussion on the trip assignment and distribution model and provides the algorithm used to compute the link travel time. Section 4, "Estimation of Highway Capacity," describes the method for estimating highway capacity and provides the algorithm and equation used for the lane capacity and for the approach to an intersection. Additional information was requested in RAI 13.03-3 (A) regarding how variables for the capacity of an approach to a signalized intersection were derived. In the response to RAI 13.03-3 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant clarified that the saturation flow rate estimates were based on observations made during the field survey and on principles in the 2000 Highway Capacity Manual. The applicant described that the mean queue discharge is specified by the analyst.

Section 1.4, "Comparison with Prior ETE Study," states that the highway free-flow speed was the variable used on all roadways rather than the maximum posted speed limit which was used in the previous analysis. Also, in Section 4, the capacity of highway sections is identified as a function of, among other things, the percentage of heavy trucks. Additional information was requested in RAI 13.03-9 (B, C) to describe the values of variables used in the equations. In the response to RAI 13.03-9 dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that posted speeds may influence free-flow speed (FFS) but posted speeds are

not used in the Highway Capacity Manual (HCM) procedures. The HCM uses the free-flow speed. In the response to RAI 13.03-9 (B, C) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that the ETE calculation did not utilize actual percentages for evaluating the effects of heavy trucks in the evacuation stream. The applicant also stated that heavy trucks traveling as "through" traffic would be diverted around the EPZ in the case of an evacuation. Section 4 references two technical publications that provide additional information on the development of the algorithms used in the modeling.

Section 4 states that at-grade intersections are apt to become the first bottleneck locations, and traffic control is often used to supersede traffic control devices at these intersections. Additional information was requested in RAI 13.03-3 (B) regarding how the use of traffic control is included in the equation in the intersection analysis. In the response to RAI 13.03-3 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that the PC-DYNEV simulation model only represents actual traffic signals and provided a discussion regarding how intersections are modeled. Appendix D, "Detailed Description of Study Procedure," identifies the steps to perform the evacuation time estimate calculations. Step 10 in Appendix D discusses how changing the control treatment at critical intersections can improve service and expedite the movement of traffic. Additional information was requested in RAI 13.03-3 (C) dated October 14, 2009 (ADAMS Accession No. ML092931167), regarding the identification of any model treatments that were used to expedite the flow of traffic. The applicant's response the applicant clarified that the evacuation of the Fermi EPZ does not require any model treatments such as contra flow, and none were used in the analysis.

Appendix G, "Traffic Management," is different from the Monroe and Wayne County traffic control plans, and the ETE Report states that the traffic management plan in the ETE does not supersede existing plans, but provides information that may be considered in updating the plan. Additional information was requested in RAI 13.03-3 (D) regarding the modeling of traffic control as a treatment to expedite the movement of traffic. In the response to RAI 13.03-3 (D) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that no allowance for reduction in the ETE due to traffic control was included in the analysis. The applicant also stated that if county traffic control points (TCPs) were manned in an evacuation, the ETE may be less than predicted in the study. In RAI 13.03-38, the staff requested that the applicant revise the text of the ETE report to clarify whether or not the current analysis approximates the use of traffic guides, based on the manner in which the analyst adjusts the green time at intersections to represent movement of traffic under evacuation conditions. In the response to RAI 13.03-38 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant stated that the ETE does not approximate the use of traffic guides at TCPs based on the adjustment of green time at signalized intersections. The response further stated explains that the ETE modeling activity is intended to realistically represent the traffic environment during emergency evacuation conditions, and the signal splits input into the model are adjusted to represent realistic human behaviors during an emergency evacuation based on traffic conditions, but they are not treated optimally as though there are expert traffic control personnel controlling the signal at all times.

Figure 8-2, "Proposed Transit Dependent Bus Routes," identifies the bus routes for individuals requiring public transit. Transit-dependent individuals are assumed to access these routes during the mobilization period. Access Control Point (ACP) #1 in Appendix G indicates that traffic barricades will be placed across Interstate 75 at S. Otter Creek Road, which would prevent the buses on Route 4 from traveling in the northbound direction as indicated on Figure 8-2. Additional information was requested in RAI 13.03-13 (D) to describe how buses

will enter the EPZ at locations where traffic control barricades block the roadway. In the response to RAI 13.03-13 (D) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that additional traffic controls will be recommended at ACP #1.

Figure E-1, "Overview of Schools within the Fermi EPZ," shows Jefferson Middle School, Sodt Elementary School, and North Elementary School located about 11 km (7 mi) or less from the EPZ boundary. Table 8-5A, "School Evacuation Time Estimates – Good Weather," indicates that the evacuation distances from these schools to the EPZ boundary are 14.7, 14.4, and 19.7 km (9.2, 9.0, and 12.3 mi), respectively. Additional information was requested in RAI 13.03-7 (A) regarding how distances are developed from the schools to the EPZ boundary. In the response to RAI 13.03-7 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant reduced the expected travel distances for Jefferson Middle School, Sodt Elementary School, and North Elementary School.

Appendix K, "Evacuation Roadway Network Characteristics," defines each roadway network segment with a numbered upstream and downstream node. Figure 1-2, "Fermi Nuclear Power Plant Link-Node Analysis Network," shows the node network used in the analysis. A legible map identifying nodes that correspond with the nodes described in Appendix K and a discussion on the narrowest roadway section was requested in RAI 13.03-8 (A) and RAI 13.03-9 (A). In the responses to these RAIs dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant provided Figures K-1 through K-21, "Fermi Link-Node Analysis Network," which contain legible nodes. The applicant also provided details regarding the survey of the roadway network and how this information is used in the analysis.

Technical Evaluation: [Section III of Appendix 4] The ETE Report provides a complete review of the evacuation road network. Analyses are made of travel times and potential locations for congestion. In addition, all evacuation route segments and their characteristics, including capacity, are described.

A traffic control and management strategy that is designed to expedite the movement of evacuating traffic is described. The traffic management strategy is based on a field survey of critical locations and consultations with emergency management and law enforcement personnel. The applicant also analyzes travel times and potential locations for serious congestion along the evacuation routes.

The staff finds the applicant's responses to RAI 13.03-3 (A, C) acceptable.

In the response to RAI 13.03-9 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised the ETE report to explain the use of FFS in evacuation time calculations. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-9(B) that clarified the textual information concerning the use of FFS in evacuation time calculations acceptable, because it conforms to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section III.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-9 (B).

In the response to RAI 13.03-9 (C) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised the ETE report to explain that the presence of trucks in the traffic stream could be significant before the declaration of the advisory to evacuate. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-9

(C) that clarified the textual information concerning the significance of trucks in the traffic stream before an evacuation advisory acceptable, because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section III.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes provided in the response to RAI 13.03-9 (C).

In the response to RAI 13.03-3 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised the ETE to clarify that the traffic simulation model represented actual traffic signals, and not the implementation of traffic control guides. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-3(B) that clarified the textual information explaining the use of the TCPs not being specifically used in the traffic simulation model acceptable because it conforms to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section III. The staff confirmed that Revision 1 of the Fermi ETE incorporated the information and textual changes in the response to RAI 13.03-3 (B).

In the response to RAI 13.03-13 (D) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised the ETE to recommend a third traffic guide in order to facilitate the movement of inbound vehicles through ACP #1. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-13(D) that adds the recommendation of third traffic guide acceptable, because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section III. The staff confirmed that Revision 2 to Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-13 (D).

In the response to RAI 13.03-7 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised distances in Tables 8-5A and 8-5B using the "calculate geometry" feature in geographic information system (GIS) and added a new table (Table 8-9) that gave the routes of buses to the EPZ boundary. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-7 (A) that recalculates evacuation distances for EPZ risk schools acceptable, because it conforms to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section III. The staff confirmed that Revision 2 of the Fermi NPP ETE the information and textual changes provided in the response to RAI 13.03-7 (A).

In the response to RAI 13.03-8 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant provided Figures K-1 through K-21 to illustrate the nodes given in Appendix K and supporting text to describe the figures. The staff finds the additional information and textual revisions submitted in response to RAI 13.03-8 (A) that provides EPZ evacuation roadway node figures acceptable, because it conforms to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section III.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes provided in the response to RAI 13.03-8 (A).

In the response to RAI 13.03-9 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised the ETE to include an explanation of how roadway characteristics are input into the traffic model. The staff finds the submitted additional information and textual revisions acceptable because it conforms to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section III.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-9 (A).

In the response to RAI 13.03-3 (D) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that no credit is taken for expected improvements that are caused by the implementation of traffic guides. However, the response to RAI 13.03-3(A) states where the specified control policy is not commensurate with attendant evacuation traffic volumes," an adjustment [is] made to the allocation of green time so that it represents the competing traffic volumes and the movement of traffic under evacuation conditions." The response further states that no allowance is made for TCP operations. The applicant's response to RAI 13.03-38 dated April 16, 2010 (ADAMS Accession No. ML101190369) provided a detailed description of the modeling approach to intersections. Therefore, the applicant's response to RAI 13.03-38 is acceptable because it meets the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section III.B.

13.3C.18.5 *Analysis of Evacuation Times*

Technical Information in the ETE Report: [Section IV of Appendix 4] Section 1.3, states that the IDYNEV system is used in the analysis and includes PC-DYNEV, which is a macroscopic traffic simulation model used to calculate the ETE. The assumptions on evacuation are based on simultaneous evacuation of inner and outer sectors. Table 7-1D, summarizes the model results and is displayed in a format consistent with Table 2 of Appendix 4 in NUREG–0654/FEMA-REP-1, Revision 1. The ETEs provided an aggregate time for the population of each of the evacuation regions to completely evacuate from that region under the conditions of the specific scenario. Figure 7-3, "Congestion Patterns at 1 hour after the Advisory to Evacuate," identifies traffic congestion areas as well as congestion areas at subsequent times in additional figures.

Section 5 describes the process of combining distribution functions to establish the time-dependent traffic loading. The data to support the loading distributions were obtained from a telephone survey conducted during development of the ETE. Additional information was requested in RAI 13.03-10 (A, B) to explain the differences between the data obtained from the telephone survey and the data used in the analyses. In the response to RAI 13.03-10 (A, B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant described the method for truncating data and discussed the basis for not using outlier data points. Special facilities and schools are not included in the trip generation distributions and are quantified separately in Section 8.

Figure 5-1, "Events and Activities Preceding the Evacuation Trip" shows the distribution functions. The trip generation activities, including the timeline for households with commuters, are described in Section 5. The timeline for households without commuters indicates that residents are at home at the time they become aware of the emergency. In addition, the timeline for transients indicates that transients do not return to their place of lodging prior to evacuating. Figure 5-3, "Comparison of Trip Generation Distributions," shows each trip generation distribution curve comprised of individual mobilization activity times. Additional information was requested in RAI 13.03-11 (A, B) regarding the trip generation time elements for residents and transients. In the response dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant agreed that residents may not be at home when an evacuation is ordered and described why this would not affect the ETE. Furthermore, in the response to RAI 13.03-11 (A), dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant replaced Figure 5-1.

In the response to RAI 13.03-11 (B) dated October 14, 2009, the applicant stated that all lodging facilities in Figure E-6, "Lodging Facilities within the FERMI EPZ," are within the 8- to 16-km (5- to 10- mi) area of the EPZ and states that the travel time from this area to the EPZ boundary would be less than the mobilization time. The applicant replaced Figure 5-1 in response to RAI 13.03-11 (B).

Section 7.4, "Guidance on Using ETE Tables," identifies the contents of Table 7-1D as the elapsed time required for 100 percent of the population within a region to evacuate from that region and indicates the ETE for the R03 summer, midweek, midday, good weather is 4:05 (4 hours and 5 minutes). Figure 5-3 indicates that the trip generation distribution for residents with commuters may take up to 5 hours. Additional information was requested in RAI 13.03-10 (C) to clarify how the trip generation time may be longer than the total ETE. In the response to this RAI dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that the trip generation time for residents with commuters is actually 4 hours, as indicated in Figure 5-3.

Section 8.4 describes a single-wave evacuation of Monroe and Wayne County Schools that would require 377 buses as identified in Table 8-2A and Table 8-2B. Additional information was requested in RAI 13.03-6 (C) to provide the source of information used to support availability of 377 buses and drivers. In the response to this RAI dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant confirmed that through the review of emergency plans and discussions with county officials, 383 buses are actually needed (271 buses in Table 8-2A and 112 buses Table 8-2B); and there are a sufficient number of buses and drivers to support a single-wave evacuation of schools. Table 8-5A indicates a 15-minute mobilization time for Airport Senior High School, Carleton Country Day, and Wager Junior High School and a 45-minute mobilization time for all other Monroe County schools and a 60-minute mobilization time for all Wayne County schools. Additional information was requested in RAI 13.03-14 (D) regarding the mobilization of resources for the evacuation of schools. In the response to RAI 13.03-14 (D) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that bus mobilization times for certain schools are shorter than others because school buses were kept on these campuses. All schools listed in Table 8-5A indicate a bus loading time of 5 minutes. The "Wayne County Emergency Operations Plan" identifies the process for loading students as being conducted one classroom at a time, with the teacher handing the student roster to the Principal when the bus is loaded. School enrollment is as high as 2,130 students. Additional information was requested in RAI 13.03-14 (E) to support the time needed to load each school bus. In the response dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant described how students at Monroe Senior High School could be boarded onto school buses within 5 minutes.

In Section 8.4 the average speed output by the model at 1 hour (51.3 kilometers per hour [kph] [31.9 mile per hour (mph)]) is used for ambulatory persons from special facilities and for emergency medical services vehicles. Similarly, Section 8.4 states that the average school bus speed at 50 minutes is 58.6 kph (36.4 mph) for Monroe County. Figure 7-4, "Congestion Patterns at 1 Hour After the Advisory to Evacuate," indicates congestion on the primary evacuation routes at this time. In RAI 13.03-12 (A) the staff requested how the vehicles would travel at the identified speeds along these congested roadways. In the response to RAI 13.03-12 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that route-specific average speeds rather than network-wide average speeds would be used for special facility buses. The applicant stated that the average network-wide speeds are applicable for emergency medical service (EMS) vehicles since they have the right-of-way. The

applicant assumed that EMS vehicles will be traveling at least the speed of general traffic. In RAI 13.03-39, the staff requested the applicant to use route-specific speeds when calculating the ETE for the EMS vehicles. In the response to RAI 13.03-39 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant agreed that route specific-speeds should be used for ambulances rather than network-wide average speeds. In RAI 13.03-53, the staff requested the applicant to explain how average speeds in Table 8-13A, which range from 41.5 to 67.7 kph (25.8 to 42.1 mph) at 60 minutes, can be greater than the speeds for vehicles leaving both before and after 60 minutes, as identified in Tables 8-11.A and 8-13.A. In the response to RAI 13.03-53 dated August 13, 2010 (ADAMS Accession No. ML102290043), the applicant stated that the speeds are related to both the time of departure and the route of travel for the facilities. The applicant reviewed all of the special facility routes and found the speeds to be accurate. The difference in speeds for the specific facilities identified is due to the time of departure and the route of travel. The applicant stated that Table 5-1 shows that only 10 percent of residents with commuters begin their evacuation trip within 60 minutes after the advisory to evacuate. Thus, the roadways are still relatively uncongested at this time in the evacuation. The applicant stated that the route speed, over time, mimics the pattern of the average network speed for the entire system and travel speeds for a single facility, such as Medilodge II, can vary significantly within a 15-minute timeframe. Additionally, the applicant stated that buses evacuating school children are routed in the direction of their respective relocation school; whereas, medical facilities are evacuated to host medical facilities. This results in the evacuating vehicles traveling along different routes. The applicant stated that the congestion diagrams in Section 7, “General Population Evacuation Time Estimates,” indicate that the evacuation routes southbound out of Monroe are heavily congested, while those routes going to the west and northwest have less congestion. This results in higher average travel speeds for westbound routes and for medical facilities.

The Monroe County Emergency Management Plan indicates that school buses will be used to support evacuation of transit dependent residents after schools have been evacuated, and the Monroe County Intermediate School District will coordinate this provision of public transportation. Section 8.4 states that it will take 90 minutes to mobilize drivers, and Section 8.1, “Transit Dependent People - Demand Estimate,” identifies the need for 100 bus runs to support evacuation of the transit dependent population. To complete 100 bus runs, Table 8-7A, “Transit Dependent Evacuation Time Estimates – Good Weather,” and Table 8-7B, “Transit Dependent Evacuation Time Estimates – Rain,” identify seven bus routes for the evacuation of transit dependent residents with multiple buses serving each route. Additional information was requested in RAI 13.03-13 (A, B) regarding specialized transportation to support evacuation of the transit dependent population and the logistics and assumptions for deployment of buses. In the response to RAI 13.03-13 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant clarified that each “set” of 20 buses assigned to Routes 1 through 4 in the first wave, is spread out over a-60 minute window, separated by a 3-minute time interval between each bus. In RAI 13.03-40, the staff requested that the applicant add additional text for Tables 8-7A and 8-7B to better indicate the assumptions regarding single wave and second wave ETE values in the tables. In the response to RAI 13.03-40 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant stated that the second wave ETE only applies when schools are in session and there are not sufficient bus resources to evacuate school children and the transit dependent general population simultaneously. Regarding RAI 13.03-13 (B), which requested information on the logistics and assumptions for deployment of buses, the applicant responded that the single wave evacuation identified in Tables 8-7A and 8-7B applies only when school is not in session or when school is in session and there are sufficient resources to evacuate schools and transit dependent residents at the

same time. The ETE includes the time for transit dependent residents to get to bus routes and pick up points. The applicant described the logistics of buses used for the evacuation of the transit dependent population. Table 8-7A and Table 8-7B have been revised to include a headway column to show the elapsed time between the first and last bus on a route. Table 8-7A provides timing for the second wave that would begin at 106 minutes (75+5+10+16). Additional information was requested in RAI 13.03-13 (C) regarding the logistics of the second wave of buses. In the response to RAI 13.03-13 (C) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant clarified that in the event of an overlap of buses, queuing would occur and explains why this would not affect the ETE.

Table 8-4, "Special Facility Transit Demand," provides facility capacities. Table 8-4 identifies each special facility by name and the specialized resources needed to support an evacuation, including 21 ambulance runs to evacuate non-ambulatory residents. The time for the 21 ambulances to mobilize is identified as 30 minutes. Additional information was requested in RAI 13.03-14 (A, B) regarding facility peak population data, resources required to support the evacuation of the facility at peak population and the ambulance response time of 30 minutes. In the response to RAI 13.03-14 (A, B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant clarified that no additional vehicle or ambulance resources would be needed to support evacuation of special facilities at full capacity.

Appendix E identifies a total of 10 marinas within the EPZ having a total vehicle estimate of 912 and a total population of 1,784. Additional information was requested in RAI 13.03-11 (C) regarding the time necessary to evacuate boaters from the EPZ. In the response to this RAI dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant described the logistics and timing of boaters loading and evacuating from marinas. The response demonstrated that this time is within the total ETE for the evacuation of the public. Appendix E also identifies two jail facilities in Monroe County. Additional information was requested in RAI 13.03-14 (C) regarding the logistics and evacuation time for the jail facilities. In the response to this RAI dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant included a new Section 8.6, "Evacuation of Inmates from Correctional Facilities," which includes an ETE and describes the resources needed to evacuate correctional facilities.

Technical Evaluation: [Section IV of Appendix 4] A total of 98 evacuation scenarios were computed for the evacuation of the general public. Each ETE quantifies the aggregate time (warning, mobilization, and travel) estimated for the population within one of the 7 Evacuation Regions to completely evacuate from that Region, under the circumstances defined for one of 14 evacuation scenarios (7 x 14 = 98). Separate evacuation time estimates are calculated for transit-dependent evacuees, including school children.

Distribution functions for notification of the three population segments of evacuees were developed. The distribution functions for the action stages after notification predict what fraction of the population will complete a particular action within a given span of time. There are distributions for auto-owning households, school population, and transit-dependent populations. These action stages for each population segment make up the trip generation distributions which are an input into the evacuation analysis. The on-road travel and delay times are then calculated inclusive of the trip generation distributions. A separate estimate of the time required to evacuate the non-auto-owning population dependent upon public transportation is developed.

The staff finds the clarifications and additional information submitted in response to RAIs 13.03-11 (C), 13.03-14 (A, B, D, E), 13.03-13 (C) acceptable because it conforms to the guidance in Appendix 4 of NUREG-0654/FEMA-REP-1, Revision 1, Section IV.

In the response to RAI 13.03-10 (A, B, and C) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised Figure 5-3 of the ETE Report and included an explanation of the process and method used to account for outlier data points. The staff finds the additional information and textual revisions submitted for Figure 5-3 and process and method used to account for outlier data points acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section IV.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-10 (A, B, and C).

In the response to RAI 13.03-11 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant provided a paragraph and revised Figure 5-1 that describes and illustrates that transients in hotels will either return to their place of lodging prior to evacuating or immediately evacuate from the EPZ. The staff finds the additional information and textual revisions submitted to clarify expected transient actions upon receiving an advisory to evacuate acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section IV.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-11 (B).

In the response to RAI 13.03-6 (C) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised the ETE to state that there are enough school buses and drivers within the Monroe and Wayne Counties available to evacuate schools in a single wave. The staff finds the additional information and textual revisions submitted that confirm there are sufficient bus and drives to support a single wave EPZ school evacuation acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section IV.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes provided in the response to RAI 13.03-6 (C).

In the response to RAI 13.03-13 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised the text and tables within the ETE Report to reflect the staggering of transit buses. The staff finds the additional information and textual revisions submitted to explain and reflect the staggering of transit buses acceptable because it conforms to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section IV.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes provided in the response to RAI 13.03-13 (B).

In the response to RAI 13.03-14 (C) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant added to the ETE Report a new Section 8.6, which includes an ETE and a description of the resources needed to evacuate correctional facilities. The staff finds the additional information and textual additions of the resources needed to evacuate correctional acceptable because conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section IV.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporate the information and textual changes in the response to RAI 13.03-14 (C).

In the response to RAI 13.03-11 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant provided a revised Figure 5-1 and the text describing the sequences of each population group. The revision was not consistent with the revised Assumption 3b, which states that all households in the EPZ with at least one commuter will await the return of the commuter before beginning their evacuation. The applicant's response to RAI 13.03-36 dated April 16, 2010 (ADAMS Accession No. ML101190369), provides the change in the number of vehicles in the evacuation stream and the reduction in transit-dependent persons in Section 8. However, for consistency, changes in the text, tables, and figures in Section 5 regarding commuters who do not return home or households that do not await the return of a commuter were needed. In the response to RAI 13.03-52 dated August 13, 2010 (ADAMS Accession No. ML102290043), the applicant stated that all applicable sections of the ETE Report will be revised to reflect the revised assumption.

In the response to RAI 13.03-12 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant stated that route-specific average speeds rather than network-wide average speeds are used for special facility buses. Average network-wide speeds of 51.3 and 58.3 kph (31.9 mph and 36.4 mph) were retained for EMS vehicles because these vehicles have the right-of-way in an emergency. The response did not address how EMS vehicles would traverse through congestion to achieve these speeds. In the response to RAI 13.03-39 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant agreed that route-specific-speeds should be used for ambulances rather than network-wide average speeds. The staff finds the additional information and textual revisions submitted to endorse the use of route specific-speeds for EMS vehicles acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section IV.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-39.

In the response to RAI 13.03-53 dated August 13, 2010 (ADAMS Accession No. ML102290043), the applicant reviewed all of the evacuation routes and confirmed the speeds used in the analysis were correct.

In the response to RAI 13.03-13 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant implied that the single-wave evacuation identified in Tables 8-7A and 8-7B would be applicable when school is not in session or when school is in session and there are sufficient resources to evacuate schools and transit-dependent residents at the same time. In the response to RAI 13.03-40 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant added text to Tables 8-7A and 8-7B to indicate the assumptions made for single wave and second wave ETE values in the tables. The staff finds the additional information and textual revisions submitted to explain single wave and second wave evacuation assumptions for transit-dependent populations acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section IV.B. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-40.

13.3C.18.6 *Other Requirements*

Technical Information in the ETE Report: [Section V of Appendix 4] The process for confirming that an evacuation is complete is in Section 12, "Confirmation Time," which includes a time estimate for confirming the evacuation. Additional information was requested in RAI 13.03-15 (A, B) regarding the time required to confirm the evacuation. In the response to

RAI 13.03-15 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant described the confirmation time with respect to guidance in NUREG–0654/FEMA-REP-1, Revision 1, and stated that the counties had not committed to implementing the recommended approach. In the response to RAI 13.03-15 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant also clarified that the time to obtain telephone numbers of residents living within the EPZ is not included in the confirmation time estimate. In RAI 13.03-41 requested the applicant to provide the amount of time the counties estimate it would take to confirm that the evacuation is complete. In the response to RAI 13.03-41 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant described confirmation options that range from surveying a statistically random sample of the telephones in the area to a full door-to-door validation. The applicant stated that County plans indicate that a confirmation of the evacuation will be accomplished by monitoring traffic flow out of the EPZ, interviewing evacuees at reception centers, or by door-to-door confirmation. The applicant provided an estimate of 21.6 hours to complete a door-to-door confirmation.

Additional information was requested in RAI 13.03-16 (A, B, C) to clarify whether State and local law enforcement officials have reviewed the traffic control plan. In the response to this RAI dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant clarified that State and local law enforcement officials received presentations that included the traffic management plan. The ETE was revised to state that the ETE had been reviewed by local offsite officials. The applicant clarified that the traffic management plan was developed to provide recommendations for measures to facilitate the evacuation of the EPZ. Furthermore, the applicant further stated that the counties have not implemented the recommendations in the ETE Report. The applicant also stated that no comments were provided by State and local organizations.

Technical Evaluation: [Section V of Appendix 4] The time required to confirm an evacuation was estimated. In addition, the development of the ETE Report was coordinated with emergency planners from the State of Michigan and Wayne and Monroe Counties who are involved in the emergency response for the site. This information is acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section V.

The staff finds the clarifications and additional information submitted in response to RAI 13.03-16 (C) acceptable, because it conforms to the guidance in Section V of Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1.

In the response to RAI 13.03-15 (B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised the ETE report to explain that telephone numbers can be compiled in the timeframe for families to mobilize and evacuate. The staff finds the additional information and textual revisions submitted to describe the time needed to compile telephone numbers acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section V. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-15 (B).

In the response to RAI 13.03-16 (A, B) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant revised Section 1.1 to state that local and State personnel have reviewed the ETE Report. The staff finds the additional information and textual revisions submitted describing the state and local reviews of the ETE Report to be acceptable, because it conforms to the guidance in Appendix 4 to NUREG–0654/FEMA-REP-1, Revision 1, Section V.

The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-16 (A, B).

In the response to RAI 13.03-15 (A) dated October 14, 2009 (ADAMS Accession No. ML092931167), the applicant described the confirmation time with respect to guidance in NUREG–0654/FEMA-REP-1, Revision 1, and stated that the counties had not committed to implementing the recommended approach. In the response to RAI 13.03-41 dated April 16, 2010 (ADAMS Accession No. ML101190369), the applicant revised the ETE report to state the time to perform a door-to-door confirmation is the bounding confirmation time. The staff finds the additional information and textual revisions submitted describing the County plans to confirm EPZ evacuations acceptable because it conforms to the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1, Section V. The staff confirmed that Revision 2 of the Fermi NPP ETE incorporated the information and textual changes in the response to RAI 13.03-41.

13.3C.18.7 *Conclusion*

NRC staff reviewed the analysis of the ETE Report as described above and concludes that the information in the ETE Report is consistent with those portions of Section 13.3 of NUREG-0800 related to the evacuation time estimate analysis and is consistent with the guidance in Appendix 4 to NUREG-0654/FEMA-REP-1, Revision 1. Therefore, the ETE Report is acceptable and meets the applicable requirements of 10 CFR Part 50, Appendix E.IV.

13.3C.19 Emergency Planning - Inspections, Tests, Analyses, and Acceptance Criteria (EP-ITAAC)

13.3C.19.1 *Regulatory Basis*

The staff considered the following regulatory requirement and guidance in the evaluation of the information in the COL application related to the EP-ITAAC:

10 CFR 52.80(a), requires that a COL application include the proposed inspections, tests, and analyses, including those applicable to EP, that the licensee shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will be operated in conformity with the COL, the provisions of the Atomic Energy Act, and the Commission's rules and regulations.

13.3C.19.2 *EP-ITAAC*

Technical Information in the Application: (52.80(a)) (NUREG-0800) The applicant addresses EP-ITAAC in Part 10, Section 2.3, “Emergency Planning ITAAC,” of the Fermi 3 COL application. Table 2.3-1, “ITAAC For Emergency Planning,” in Part 10 contains the proposed EP-ITAAC for those elements of the emergency plan that cannot be completed during the COL application review phase. NUREG-0800 contains a generic set of acceptable EP-ITAAC. The generic EP-ITAAC requires the COL applicant to provide acceptance criteria specific to the plant-specific design and site-specific emergency response plans and facilities.

The staff reviewed Table 2.3-1 against the generic set of EP-ITAAC in Table 14.3.10-1 of NUREG-0800. The staff’s review noted inconsistencies between the Fermi 3 proposed EP-

ITAAC in Table 2.3-1 and NUREG-0800, Table 14.3-10-1. The staff issued RAIs 13.03-017-01 through 13.03-017-12 and RAIs 13.03-55 through 13.03-80 requesting the applicant to address the inconsistencies in the applicant's documentation concerning staffing, EALs, and acceptance criteria associated with Emergency Planning. The staff reviewed the applicant's responses to RAIs 13.03-017-01 through 13.03-017-12 dated September 30, 2009 (ADAMS Accession No. ML092750405) and responses to RAIs 13.03-55 through 13.03-80 dated October 6, 2010 (ADAMS Accession No. ML102810222), along with proposed revisions to Table 2.3-1 and found them to be acceptable with the exception of RAI 13.03-72 and 13.03-79. The staff identified additional inconsistencies and issued RAIs 13.03-83 through 13.03-90 as described below.

In RAI 13.03-83, the staff asked the applicant to provide a basis for including ITAAC 5.3 that demonstrates the operability of the siren system. Given that the Fermi 3 site will use the existing Fermi 2 siren system that is currently inspected under the Reactor Oversight Program and may be presumed adequate for the purposes of this COL. In the response to this RAI dated December 6, 2013 (ADAMS Accession No. ML13344B028) the applicant stated that ITAAC 5.3 will be revised to state, "The capability of the Alert and Notification System (ANS) to operate properly is tested monthly by the Fermi 2 Reactor Oversight Program and may be presumed adequate for the purposes of the Fermi 3 Emergency Plan as identified in NRC RAI Letter 52 dated March 29, 2011 (ADAMS Accession No. ML110590635), (RAI 13.03-83)."

In RAI 13.03-84, the staff asked the applicant to remove program Element 10.4 that states, "The means exists to register and monitor evacuees at relocation centers" in accordance with NUREG–0654 evaluation Criteria II.J.12. This Criterion II.J.12 is not applicable to licensees and therefore is not needed in the COL application. In the response to this RAI dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant stated that Detroit Edison agrees that Evaluation Criterion II.J.12 of NUREG–0654 is not applicable to licensees, and Table 2.3-1 will be revised to remove Emergency Plan Program Element 10.4.

In RAI 13.03-85, the staff asked the applicant, to revise the acceptance criteria in ITAAC 14.1.1.A.1 for declaring an EAL to be from the time the information is available to the decision maker and not from when the information is noticed by the decision maker. In the response to this RAI dated December 6, 2013 (ADAMS Accession No. ML13344B028), the applicant stated that Acceptance Criterion 14.1.1.A.1.a will be revised to state, "Determine the correct highest emergency classification level based on events which were in progress, considering past events and their impact on the current conditions, within 15 minutes of indications for an emergency event."

In RAI 13.03-86, the staff asked the applicant to revise the acceptance criteria for ITAAC 10.1 to match the corresponding written change in response to RAI 13.03-72 dated October 6, 2010 (ADAMS Accession No. ML102810222). In the response to this RAI dated December 6, 2013 (ADAMS Accession No. ML13344B028) the applicant stated that the Acceptance Criterion 10.1 in Table 2.3-1 will be changed to address the specific capability to provide both warnings and instructions to individuals outside the protected area, but within the owner-controlled area in accordance with written change made in the response to RAI 13.03-72.

Technical Evaluation: (52.80(a)) (NUREG-0800) The staff finds the additional information and textual revisions to Part 10 of the Fermi 3 application submitted in response to RAIs 13.03-17-01 through 13.03-17-012, RAIs 13.03-55 through 13.03-71, RAIs 13.03-73 through 13.03-78, and RAI 13.03-80 acceptable because they conform to the guidance in NUREG-0800. The staff confirmed that Revision 7 of the Fermi 3 FSAR, Part 10, Table 2.3-1,

incorporated the information and textual changes in the responses to the aforementioned RAIs and the proposed markup to Table 2.3-1.

The staff created Confirmatory Item 13.03-68 to track the revision of EP-ITAAC 5.3 (RAI 13.03-83). The staff verified that FSAR Revision 7 of the Fermi 3 COL includes the corrections to EP-ITAAC 5.2. Therefore, Confirmatory Item 13.03-68 is resolved.

The staff created Confirmatory Item 13.03-69 to track the Table 2.3-1 revision removing Emergency Plan Program Element 10.4 (RAI 13.03-84). The staff verified that FSAR Revision 7 of the Fermi 3 COL includes the removal of Emergency Plan program element 10.4 from Table 2.3-1. Therefore, Confirmatory Item 13.03-69 is resolved.

The staff created Confirmatory Item 13.03-70 to track the revision of Acceptance Criterion 14.1.1.A.1.a to state, "Determine the correct highest emergency classification level based on events which were in progress, considering past events and their impact on the current conditions, within 15 minutes of indications for an emergency event." (RAI 13.03-85). The staff verified that FSAR Revision 7 of the Fermi 3 COL includes the revision of Acceptance Criterion 14.1.1.A.1.a. Therefore, Confirmatory Item 13.03-70 is resolved.

The staff created Confirmatory Item 13.03-71 to track the revision to Table 2.3-1 to specifically address the capability to provide both warnings and instructions to individuals outside the protected area, but within the owner-controlled area (RAI 13.03-86). The staff verified that FSAR Revision 7 of the Fermi 3 COL includes the revision to Table 2.3-1 to address warning and instruction capability outside the protected area. Therefore, Confirmatory Item 13.03-71 is resolved.

13.3C.19.3 *Conclusion*

The NRC staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the required information relating to the EP-ITAAC, the generic EP-ITAAC in Table 14.3.10-1 of NUREG–0800, 10 CFR 52.80(a), and Section 14.3.10 of NUREG-0800. The staff finds that the applicant has adequately addressed the applicable EP-ITAAC needed to provide reasonable assurance that upon the successful completion, the facility will be constructed and operated to conform with the COL, the provisions of the Atomic Energy Act, and the Commission rules and regulations. No outstanding information is expected to be addressed in the Fermi 3 COL application related to this section. The results of the NRC staff's technical evaluation of the information incorporated by reference into the Fermi 3 COL application are documented in NUREG–1966.

13.4 Operational Program Implementation

13.4.1 Introduction

This section of the FSAR addresses the operational programs described in NRC guidance SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria." The section includes a description of the programs and the proposed implementation milestones for each program.

This section describes the proposed implementation milestones for each operational program in compliance with the guidance of RG 1.206, Regulatory Position C.I.13.4. The applicant provides this information in FSAR Table 13.4-201 "Operational Programs Required by NRC Regulations," which lists each operational program, the regulatory requirement for the program, the associated implementation milestone(s), and the section of the FSAR that describes the operational program.

13.4.2 Summary of Application

Section 13.4 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 13.4 of the certified ESBWR DCD, Revision 10. In addition, in FSAR Section 13.4, the applicant provides the following:

COL Items

- STD COL 13.4-1-A Operational Programs

Table 13.4-201 lists each operational program, the regulatory source for the program, the associated implementation milestone(s), and the section of the FSAR that fully describes the operational program, as required by RG 1.206.

- STD COL 13.4-2-A Implementation Milestones

The applicant provided the information in FSAR Table 13.4-201, which lists each operational program, the regulatory requirement for each program, the associated implementation milestone(s), and the section of the FSAR that fully describes the operational program consistent with the guidance in RG 1.206.

13.4.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG-1966. In addition, in the Staff Requirements Memorandum on SECY-05-0197, the Commission provided the following directions regarding operational programs:

- Include license conditions for operational programs in the COL, where implementation requirements are not specified in the regulations.
- Identify the list of operational programs required to be included in a COL application.
- Use the proposed generic EP-ITAAC as a model for EP-ITAAC to be included in COL applications.
- SRP Section 13.4 provides guidance for staff review. For a COL application, the staff reviews the applicable table in FSAR Section 13.4 to ensure that all required operational programs are included. The staff's review of the operational program description and the proposed implementation milestones is performed within the identified SRP section reviews.

13.4.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 13.4 of the certified ESBWR DCD. The staff reviewed Section 13.4 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to this section.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

- STD COL 13.4-1-A Operational Programs
- STD COL 13.4-2-A Implementation Milestones

NRC staff reviewed FSAR Table 13.4-201 and determined that the applicant had identified the operational programs required by NRC regulations and had provided a description of the proposed implementation milestones for each program. The technical evaluation of the operational programs to ensure that the applicant has fully described the programs and their associated implementation milestones is provided in the respective section of this SER.

Operational Program Implementation Schedule License Condition:

> No later than 12 months after issuance of the COL, Detroit Edison shall submit to the Director of NRO, or the Director's designee, a schedule for implementation of the operational programs listed in FSAR Table 13.4-201, including the associated estimated date for initial loading of fuel.
>
> The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until all the operational programs listed in FSAR Table 13.4-201 have been fully implemented.

13.4.5 Post Combined License Activities

License Condition (13.4-1) In FSAR Table 13.4-201, the applicant identifies the implementation milestones for each operational program. These implementation milestones, the schedule for which is required to be submitted and updated in accordance with the license condition described above, specify activities to be completed following issuance of the COL. Implementation of each operational program will be evaluated by the staff according to the respective implementation milestone.

13.4.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

In addition, the staff compared the additional COL information in the application to the relevant NRC regulations, the guidance in Subsection 13.4 of NUREG–0800, and other NRC RGs. The staff's review concludes that the applicant has presented adequate information on COL Items STD COL 13.4-1-A and 13.4-2-A in Table 13.4-201 of the COL FSAR.

13.5 Plant Procedures

This section of the FSAR addresses the administrative and operating procedures that the operating organization (plant staff) uses to ensure that routine operating, off-normal, and emergency activities are conducted in a safe manner. This section is divided into two subsections that are described below—Administrative Procedures and Operating and Emergency Operating Procedures. The Inspection of the procedures will occur as part of the construction inspection program.

13.5.1 Administrative Procedures

13.5.1.1 *Introduction*

The administrative procedures the applicant uses to ensure that routine operating, off-normal, and emergency activities are conducted in a safe manner are provided. In plant procedures, the applicant provides a brief description of the nature and content of the procedures and a schedule for the preparation of appropriate written administrative and operating procedures. The applicant delineates in the description of the procedures the functional position for procedural revisions and approval before implementation.

13.5.1.2 *Summary of Application*

Section 13.5.1 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 13.5.1 of the certified ESBWR DCD Revision 10. In addition, in FSAR Section 13.5.1, the applicant provides the following information:

COL Item

- STD COL 13.5-1-A Administrative Procedures Development Plan

Industry guidance for the appropriate format, content, and typical activities delineated in written procedures is implemented, as appropriate. Guidance is based on ASME NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications."

The applicant identified the following commitment:

Supplemental Information

- STD SUP 13.5-1 Plant Procedure

In FSAR Section 13.5, the applicant states that this section describes the administrative and operating procedures that the operating organization (plant staff) uses to conduct routine operating, abnormal, and emergency activities in a safe manner.

- STD SUP 13.5-2

The quality assurance program description (QAPD) describes procedural document control, record retention, adherence, assignment of responsibilities, and changes.

- STD SUP 13.5-3

Procedures are identified in this section by topic, type, or classification in lieu of the specific title and represent general areas of procedural coverage.

- STD SUP 13.5-4

The applicant states that through Commitment (COM13.5-001), procedures are developed before fuel loading to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations.

- EF3 COL 13.5-4-A

The applicant states that industry guidance in ASME NQA-1 for the appropriate format, content, and typical activities delineated in written procedures is implemented, as appropriate. .

- STD SUP 13.5-5 Control of Procedure Format and Content

The format and content of procedures are controlled by administrative procedure(s). Procedures are organized to include the following components, as necessary:

- Title Page
- Table of Contents
- Scope and Applicability
- Responsibilities
- Prerequisites
- Precautions and Limitations
- Main Body
- Acceptance Criteria
- Check-off Lists
- References
- Attachments and Data Sheets

- STD SUP 13.5-6 Procedure Detail

Each procedure is sufficiently detailed for an individual to perform the required function without direct supervision but does not provide a complete description of the system or plant process. The level of detail in the procedure is commensurate with the qualifications of the individual normally performing the function.

- STD SUP 13.5-7 Procedure Development

Procedures are developed to be consistent with the guidance described in DCD Section 18.9, "Procedure Development," and with input from the HFE process and evaluations.

The bases for procedure development include:

- Plant design bases
- System-based technical requirements and specifications
- Task analyses results
- Risk-important human actions identified in the human reliability analysis (HRA)/probabilistic risk assessment (PRA)
- Initiating events considered in the EOPs, including those events in the design bases
- Generic Technical Guidelines (GTGs) for EOPs

Procedure verification and validation (V&V) includes the following activities, as appropriate:

- A review to verify they are correct and can be carried out.
- A final validation in a simulation of the integrated system as part of the V&V activities as described in DCD Section 18.11, "Human Factors Verification and Validation."
- A verification of modified procedures for adequate content, format, and integration.
- The procedures are assessed through validation if a modification substantially changes personnel tasks that are significant to plant safety. The validation verifies that the procedures correctly reflect the characteristics of the modified plant and can be performed effectively to restore the plant.

- STD SUP 13.5-8 Shutdown Management Procedures

Procedures for shutdown management are developed to be consistent with the guidance in NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," to reduce

the potential for the loss of reactor coolant system (RCS) boundary and inventory during shutdown conditions.

- STD SUP 13.5-9 Administrative Procedures for Activities that Are Important to Safety

This section describes administrative procedures that provide administrative controls over activities that are important to safety for the operation of the facility.

- EF3 SUP 13.5-10 Administrative Procedures Described in ASME NQA-1

This supplemental information defines where the essential elements of the administrative programs and controls are described in ASME NQA-1 and FSAR Section 17.5.

- EF3 SUP 13.5-11 Procedure Control as Discussed in the QAPD

The applicant states that the procedural control is discussed in the QAPD, and the types and content of the procedures are discussed in FSAR Section 13.5.

- STD SUP 13.5-12 Procedure Style (Writer) Guide

The applicant defines the procedure writer's guide.

- STD SUP 13.5-13 Procedures for Maintenance and Control of Procedural Updates

The applicant states that updates to maintenance and control procedures are performed according to the QAPD.

- STD SUP 13.5-14 Pre-COL Administrative Programs and Procedures

The applicant states that pre-COL administrative programs and procedures are described in Table 13.5-201.

- STD SUP 13.5-15 Administrative Procedures for Control of Operation Activities

The applicant describes procedures that provide administrative controls on procedures for operational activities.

- STD SUP 13.5-16 Plant Administrative Procedures

The applicant provides a list of plant administrative procedures.

13.5.1.3 *Regulatory Basis*

The regulatory basis of the information incorporated by reference is in NUREG-1966. In addition, the relevant requirements of the Commission regulations for the administrative and

plant procedures, and the associated acceptance criteria, are in Section 13.5.1 and Subsection 13.5.2.1 of NUREG–0800.

In particular, the relevant provisions for reviewing plant procedures are based on (1) meeting the methods and criteria described in 10 CFR 52.79(a)(14), (26), (29)(i), (29)(ii), (33), and (34), and in TMI Action Plan Items I.C.1 and I.C.9; and (2) meeting the guidance of NUREG–0800, Subsections 13.5.1.1 and 13.5.2.1. The review of FSAR information related to the development of emergency procedures is based on meeting the requirements of 10 CFR 52.79(a)(14), (26), (29)(i), (29)(ii), (33), and (34); and the guidance of NUREG–0800, Subsection 13.5.2.1.

The provisions for reviewing COL Item STD COL 13.5-1-A related to the implementation of the plan are based on the following:

- Meeting the requirements of 10 CFR 52.79(a)(14), (26), (29)(i), (29)(ii), (33), and (34)
- Meeting the TMI Action Plan requirements described in NUREG–0737 and Supplement 1 to NUREG–0737
- The plant procedures in accordance with the provisions of TMI Action Plan Item I.C.5
- The guidance of NUREG–0800, Subsections 13.5.1.1 and 13.5.2.1

The relevant provisions for reviewing FSAR information related to the procedures included in the scope of the plan are based on (1) meeting the requirements of the procedures in Sections A3, A5, and A10 of ANSI/ANS-3.2; and (2) meeting the guidance of NUREG-0800, Subsections 13.5.1.1 and 13.5.2.1.

13.5.1.4 *Technical Evaluation*

As documented in NUREG–1966, NRC staff reviewed and approved Section 13.5.1 of the certified ESBWR DCD. The staff reviewed Section 13.5.1 of the Fermi 3 COL FSAR, Revision 7 and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information relating to administrative procedures.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Item

- STD COL 13.5-1-A Administrative Procedures Development Plan

The applicant states that industry guidance ASME NQA-1 for the appropriate format, content, and typical activities delineated in written procedures is implemented, as appropriate.

ESBWR DCD Tier 2, Section 13.5.1 states that the applicant shall develop the administrative procedures. In Fermi 3 COL FSAR, the applicant adds a new Section 13.5.1. The applicant states that the purpose of the new information is to address the development of administrative

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

procedures in accordance with the nominal schedule in Table 13.5-202. The staff reviewed FSAR Section 13.5.1 and Table 13.5-202 and determined that they address the development of the administrative procedures within the timeline specified in NUREG–0800, Subsection 13.5.1.1. The staff concluded that the new paragraph meets the criteria in NUREG-0800, Subsection 13.5.1.1.

Supplemental Information

STD SUP Items 13-5-1 through13.5.8, in addition to the supplemental items in Sections 13.5.1 and 13.5.2 of the FSAR, further describe the applicant's process for developing all of the Fermi 3 procedures listed in FSAR Section 13.5.

- STD SUP 13.5-1 Plant Procedure

The staff reviewed STD SUP 13.5-1, which describes the administrative and operating procedures used to conduct routine operating, abnormal, and emergency operating activities. The staff determined that this section of the applicant's FSAR meets the criteria in NUREG-0800, Subsection 13.5.1.1 and is therefore acceptable.

- STD SUP 13.5-2

The QAPD describes procedural document control, record retention, adherence, assignment of responsibilities, and changes. The QAPD is evaluated in Chapter 17, "Quality Assurance," of this SER.

- STD SUP 13.5-3

This section identifies procedures by topic, type, or classification in lieu of the specific title, and represents general areas of procedural coverage.

The staff reviewed STD SUP 13.5-3, which states that plant procedures are identified by topic, type, or classification. The staff determined that this section of the applicant's FSAR meets the criteria in NUREG–0800, Subsection 13.5.1.1 and is therefore acceptable.

- STD SUP 13.5-4

The applicant states that:

> Procedures are developed prior to fuel load to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations. [COM 13.5-001]

The staff reviewed STD SUP 13.5-4, which includes a Commitment (COM 13.5-001) to develop plant procedures before initial fuel loading. The staff determined that this section of the applicant's FSAR meets the criteria in NUREG–0800, Subsection 13.5.1.1 and is therefore acceptable.

- EF3 COL 13.5-4-A

The staff reviewed EF3 COL 13.5-4-A, which states that industry guidance based on ASME NQA-1 is implemented as appropriate for the format, content, and activities delineated in written procedures. The staff determined that this section of the applicant's FSAR meets the criteria in NUREG–0800, Subsection 13.5.1.1 and is therefore acceptable.

- STD SUP 13.5-5 Control of Procedure Format and Content

Administrative procedures control the format and content of procedures, which are organized to include the following components, as necessary:

- Title Page
- Table of Contents
- Scope and Applicability
- Responsibilities
- Prerequisites
- Precautions and Limitations
- Main Body
- Acceptance Criteria
- Check-Off Lists
- References
- Attachments and Data Sheets

The staff reviewed STD SUP 13.5-5, which states that the format and content of plant procedures used to conduct routine operating, abnormal, and emergency operating activities. The staff determined that this section of the applicant's FSAR meets the criteria in NUREG-0800, Subsection 13.5.1.1 and is therefore acceptable.

- STD SUP 13.5-6 Procedure Detail

The staff reviewed STD SUP 13.5-6, which states that the plant procedures used to conduct routine operations and abnormal and emergency operating activities should have the level of detail commensurate with the qualifications of the individual performing the required functions. The staff determined that this section of the applicant's FSAR meets the criteria in NUREG-0800, Subsection 13.5.1.1 and is therefore acceptable.

- STD SUP 13.5-7 Procedure Development

Procedures should be developed consistent with the guidance described in DCD Tier 2, Section 18.9, and with input from the human factors engineering process and evaluations.

The bases for procedural development include:

- Plant design bases
- System-based technical requirements and specifications
- Task analyses results

- Risk-important human actions identified in the HRA/PRA
- Initiating events considered in the EOPs, including those events in the design bases
- GTGs for EOPs

Procedure V&V includes the following activities, as appropriate:

- A review to verify that they are correct and can be carried out
- A final validation in a simulation of the integrated system as part of the V&V activities as described in DCD Tier 2, Section 18.11.
- Verification that modified procedures have adequate content, format, and integration
- The procedures are assessed through validation if a modification substantially changes personnel tasks that are significant to plant safety. The validation verifies that the procedures correctly reflect the characteristics of the modified plant and can be performed effectively to restore the plant.

The staff reviewed STD SUP 13.5-7, which states that plant procedures used to conduct routine operation and abnormal and emergency operating activities should be consistent with the guidance described in DCD Tier 2, Section 18.9. The staff determined that this section of the applicant's FSAR is consistent with the guidance in DCD Tier 2, Section 18.9 and meets the criteria in NUREG–0800, Subsection 13.5.1.1 and is therefore acceptable.

- STD SUP 13.5-8 Shutdown Management Procedures

The staff reviewed STD SUP 13.5-08, which states that procedures for managing a shutdown should be consistent with the guidance in NUMARC 91-06. The staff determined that this section of the applicant's FSAR is consistent with the guidance in NUMARC 91-06 and meets the criteria in NUREG–0800, Subsection 13.5.1.1. This information is therefore acceptable.

- STD SUP 13.5-9 Administrative Procedures for Activities that Are Important to Safety

NUREG–0800, Subsection 13.5.1.1 states that the applicant should describe the procedures that provide administrative controls over safety-related activities for the operation of the facility. In FSAR Subsection 13.5.1.1, the applicant replaces the first sentence of the paragraph to supplement the DCD with an applicant-specific description of facility administrative controls. The staff concluded that the applicant-provided descriptions of plant administrative procedures meet the criteria in NUREG–0800, Subsection 13.5.1.1 and are therefore acceptable.

- EF3 SUP 13.5-10 Administrative Procedures Described in ASME NQA-1

The applicant states that:

> Procedures outline the essential elements of the administrative programs and controls described in ASME NQA-1 and Section 17.5. These procedures are organized to prescribe the programmatic elements in documents normally referred to as administrative procedures.
>
> Administrative procedures contain adequate programmatic controls to provide an effective interface between organizational elements, including contractor and owner organizations that support the station operating organization.

NUREG–0800, Subsection 13.5.1.1 states that the applicant should describe the procedures that provide administrative controls over safety-related activities for the operation of the facility, but applicants are not required to include detailed written procedures in the FSAR. In FSAR Subsection 13.5.1.1, the applicant lists the Category (A) Controls and Category (B) Specific Procedures described in NUREG–0800, Subsection 13.5.1.1. The staff determined that this information meets the criteria of NUREG–0800 Subsection 13.5.1.1 and is therefore acceptable.

- EF3 SUP 13.5-11 Procedure Control as Discussed in the QAPD

NUREG–0800, Subsection 13.5.1.1 states that the applicant should describe the procedures that provide for administrative controls over safety-related activities for the operation of the facility, but applicants are not required to include detailed written procedures in the FSAR. In FSAR Subsection 13.5.1.1, the applicant lists the Category (A) Controls and Category (B) Specific Procedures described in NUREG–0800, Subsection 13.5.1.1. The Supplemental Information EF3 SUP 13.5-11 refers to the QAPD and FSAR Section 13.5. The staff's review of these sections concluded that the applicant has provided an adequate and acceptable description of procedural controls in the Fermi 3 COL FSAR that meets the criteria in NUREG-0800, Subsection 13.5.1.1.

- STD SUP 13.5-12 Procedure Style (Writer) Guide

The applicant states that:

> A procedure style (writer's) guide promotes the standardization and application of HFE principles to procedures. The writer's guide establishes the process for developing procedures that are complete, accurate, consistent, and easy to understand and follow. The guide provides objective criteria so that procedures are consistent in organization, style, and content. The writer's guide provides criteria for the content and format of procedures, including written action steps and specific acceptable acronym lists and terms to be used.

In NUREG–0800, Subsection 13.5.1.1, Area of Review Item 1.A, "Category (A) Controls," states that the applicant should describe the procedural review and approval process. Inherent in this discussion is the use of a procedure writer's guide. In FSAR Subsection 13.5.1.1, the applicant adds a new paragraph under STD SUP 13.5-12 that describes the writer's guide and promotes the standardization of procedures that include human factor applications and consistent organization, style, and content. The staff concluded that the applicant has provided acceptable general operating descriptions of procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1.

- STD SUP 13.5-13 Procedures for Maintenance and Control of Procedural Updates

The applicant states that:

> Procedure maintenance and control of procedure updates are performed in accordance with the QAPD.

NUREG–0800, Subsection 13.5.1.1 states that the applicant should describe the procedures that provide administrative controls over safety-related activities for the operation of the facility, but the applicant is not required to include detailed written procedures in the FSAR. In FSAR Subsection 13.5.1.1, the applicant lists the Category (A) Controls and Category (B) Specific Procedures described in NUREG–0800, Subsection 13.5.1.1. In STD SUP 13.5-13, the applicant states that the control over the maintenance and updates of procedures is performed in accordance with the QAPD. The staff determined that this information meets the criteria of NUREG–0800, Subsection 13.5.1.1 and is therefore acceptable.

- STD SUP 13.5-14 Pre-COL Administrative Programs and Procedures

The applicant states:

> The administrative programs and associated procedures developed in the pre-COL phase are described in Table 13.5-201 (for future designation as historical information).

NUREG–0800, Subsection 13.5.1.1 states that the applicant should describe the procedures that provide administrative control over safety-related activities for the operation of the facility, but the applicant is not required to include detailed written procedures in the FSAR. In FSAR Subsection 13.5.1.1, the applicant lists the Category (A) Controls and Category (B) Specific Procedures described in NUREG–0800, Subsection 13.5.1.1. In FSAR Section 13.5.1, STD SUP 13.5-14 refers to Table 13.5-201. The staff's review of these sections concluded that the applicant has provided an adequate description of procedural controls in the FSAR that meets the criteria in NUREG–0800, Subsection 13.5.1.1. This information is therefore acceptable.

- STD SUP 13.5-15 Administrative Procedures for Control of Operational Activities

The applicant states:

> Subsection 13.5.1.1, "Administrative Procedures-General," describes those procedures that provide administrative controls with respect to procedures, including those that define and provide controls for operational activities of the plant staff.

NUREG–0800, Subsection 13.5.1.1 states that the applicant should describe the procedures that provide administrative control over safety-related activities for the operation of the facility, but the applicant is not required to include detailed written procedures in the FSAR. In FSAR Subsection 13.5.1.1, the applicant lists the Category (A) Controls and Category (B) Specific Procedures described in NUREG–0800, Subsection 13.5.1.1. The staff reviewed these listed procedures, regulatory requirements, and proposed completion times per Table 13.5-202 in the

COL FSAR. The staff concluded that the applicant has provided an acceptable and adequate description of procedural controls in the FSAR that meets the criteria in NUREG-0800, Subsection 13.5.1.1.

- STD SUP 13.5-16 Plant Administrative Procedures

The applicant states that:

> Plant administrative procedures provide procedural instructions for the following:
>
> - Procedures review and approval
> - Procedure adherence
> - Scheduling for surveillance tests and calibration
> - Log entries
> - Record retention
> - Containment access
> - Bypass of safety function and jumper control
> - Communication systems
> - Equipment control procedures—These procedures provide for control of equipment, as necessary, to maintain personnel and reactor safety, and to avoid the unauthorized operation of equipment
> - Control of maintenance and modifications
> - Fire Protection Program procedures
> - Crane Operation Procedures—Crane operators who operate cranes over fuel pools are qualified and conduct themselves in accordance with ANSI B30.2 (Chapter 2-3), “Overhead and Gantry Cranes”
> - Temporary changes to procedures
> - Temporary procedure issuance and control
> - Special orders of a temporary or self-canceling nature
> - Standing orders to shift personnel including the authority and responsibility of the shift manager, senior reactor operator in the control room, control room operator, and shift technical advisor
> - Manipulation of controls and assignment of shift personnel to duty stations per the requirements of 10 CFR 50.54 (i), (j), (k), (l), and (m), including delineation of the space designated for the “At the Controls” area of the Control Room
> - Shift relief and turnover procedures
> - Fitness for duty (FFD)
> - Control Room access

- Working hour limitations
- Feedback of design, construction, and applicable important industry and operating experience
- Shift Manager administrative duties
- Verification of correct performance of operational activities
- A vendor interface program that provides vendor information for safety-related components is incorporated into plant documentation

NUREG–0800, Subsection 13.5.1.1 states that the applicant should describe the procedures that provide administrative controls over safety-related activities for the operation of the facility, but the applicant is not required to include detailed written procedures in the FSAR. In FSAR Subsection 13.5.1.1, the applicant lists the Category (A) Controls and Category (B) Specific Procedures described in NUREG–0800, Subsection 13.5.1.1. The staff's review of these listed procedures, regulatory requirements, and proposed completion times per COL FSAR Table 13.5-202 concluded that the applicant has provided acceptable and adequate descriptions of procedural controls in the COL FSAR that meet the criteria in NUREG–0800, Subsection 13.5.1.1.

13.5.1.5 *Post Combined License Activities*

The applicant identifies the following commitment under the Supplemental Information STD SUP 13.5-4:

> Procedures are developed prior to fuel load to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations. [COM 13.5-001]

13.5.1.6 *Conclusion*

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

In addition, the staff compared the additional COL item and supplemental information in the application to the relevant NRC regulations, the guidance in Section 13.5.1 and Subsections 13.5.1.1 and 13.5.2.1 of NUREG-0800; and other NRC RGs. The staff's review concludes that the applicant has presented adequate information in the Fermi 3 FSAR to meet the guidance in NUREG–0800. Thus, the applicant has adequately addressed COL Item STD COL 13.5-1-A, Supplemental Information Items STD SUP 13.5-1 through 13.5-16, and EF3 COL 13.5-4-A relating to administrative procedures.

13.5.2 Operating and Maintenance Procedures

13.5.2.1 *Introduction*

This section of the FSAR provides the operating and maintenance procedures that the plant staff uses to ensure that routine operating, off-normal, and emergency activities are conducted in a safe manner. The plant procedures provide a brief description of the nature and content of the procedures and a schedule for preparing appropriate written operating and maintenance procedures. This FSAR section also delineates in the description of operating and maintenance procedures the functional position for a procedural revision and approval process before implementation.

13.5.2.2 *Summary of Application*

Section 13.5.2 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 13.5.2 of the certified ESBWR DCD, Revision 10. In addition, in COL FSAR Section 13.2, the applicant provides the following.

COL Items

- STD COL 13.5-2-A Plant Operating Procedures Development Plan

Operating and maintenance procedures will be developed in accordance with DCD Section 13.5.2.

- STD COL 13.5-3-A Emergency Procedures Development

Emergency procedures will be developed in accordance with DCD Section 13.5.2.

- EF3 COL 13.5-4-A Implementation of the Plant Procedures Plan

A Plant Operating Procedures Development Plan will be established in accordance with DCD Section 13.5.2.

- STD COL 13.5-5-A Procedures Included in Scope of Plan

The scope of the procedures in the Plant Operating Procedures Development Plan will be addressed in DCD Section 13.5.2.

- STD COL 13.5-6-A Procedures for Calibration, Inspection, and Testing

The applicant states that the calibration, inspection, and testing procedures are included in the Plant Operating Procedures Development Plan.

Supplemental Information

- STD SUP 13.5-18 Classification of Procedures
- STD SUP 13.5-19 System Operating Procedures
- STD SUP 13.5-20 General Operating Procedures
- STD SUP 13.5-21 Abnormal Operating Procedures

- EF3 SUP 13.5-22 Emergency Operating Procedures
- STD SUP 13.5-23 Alarm Response Procedures
- EF3 SUP 13.5-24 Temporary Procedures
- STD SUP 13.5-25 Fuel Handling Procedures
- STD SUP 13.5-26 Maintenance and Other Operating Procedures
- STD SUP 13.5-27 Plant Radiation Protection Procedures
- STD SUP 13.5-28 Emergency Preparedness Procedures
- STD SUP 13.5-29 Instrument Calibration and Test Procedures
- STD SUP 13.5-30 Chemistry Procedures
- STD SUP 13.5-31 Radioactive Waste Management Procedures
- STD SUP 13.5-33 Inspection Procedures
- STD SUP 13.5-34 Modification Procedures
- STD SUP 13.5-35 Heavy Load Handling Procedures
- STD SUP 13.5-36 Material Control Procedures
- STD SUP 13.5-37 Security Procedures
- STD SUP 13.5-38 Refueling and Outage Planning Procedures
- STD SUP 13.5-40 Procedure related to Refueling Cavity Integrity

Each standard or site-specific supplement defines the procedure of interest.

13.5.2.3 *Regulatory Basis*

The regulatory basis of the information incorporated by reference is in NUREG-1966. In addition, the relevant requirements of the Commission regulations for the plant operating and maintenance procedures, and the associated acceptance criteria, are in Subsection 13.5.2.1 of NUREG–0800.

In particular, the relevant provisions for reviewing plant procedures are based on (1) meeting the requirements of methods and criteria described in 10 CFR 52.79(a)(14), (26), (29)(i), (29)(ii), (33), and (34) and TMI Action Plan Items I.C.1 and I.C.9; and (2) meeting the guidance of NUREG–0800, Subsection 13.5.2.1. The review of FSAR information related to the development of emergency procedures is based on meeting the requirements of 10 CFR 52.79(a)(14), (26), (29)(i), (29)(ii), (33), and (34) and the guidance of NUREG–0800, Subsection 13.5.2.1.

13.5.2.4 *Technical Evaluation*

As documented in NUREG–1966, NRC staff reviewed and approved Section 13.5.2 of the certified ESBWR DCD. The staff reviewed Section 13.5.2 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information relating to operating and maintenance procedures.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

In addition, the staff reviewed the resolution to the following COL and supplemental information items included under Section 13.5.2 of the COL FSAR. In this review, the staff used the applicable sections of NUREG–0800 as guidance.

COL Items

- STD COL 13.5-2-A Plant Operating Procedures Development Plan

The third paragraph of Section 13.5.2 in DCD Tier 2 is replaced with the following:

> Operating Procedures are developed in accordance with Subsection 13.5.2.1 and Maintenance Procedures are developed in accordance with Subsection 13.5.2.2.6.1.

ESBWR DCD Tier 2, Section 13.5.2 states that the development of operating and maintenance procedures is the responsibility of the applicant. In Fermi 3 COL FSAR Section 13.5.2, the applicant states that the new Subsection 13.5.2.1 was added to address the development of operating procedures, and the new Subsection 13.5.2.2.6.1 was added to address the development of maintenance procedures. In FSAR Subsection 13.5.2.2.6.1, the applicant provides Commitment (COM 13.5-004), which states the following:

> An initial program based on service conditions, experience with comparable equipment and vendor recommendations is developed prior to fuel loading.

The staff reviewed Subsection 13.5.2.1 and determined that it addresses the development of operating procedures, which will be developed at least 6 months before fuel load. The staff reviewed Subsection 13.5.2.2.6.1 and determined that it addressed the development of maintenance procedures. The staff concluded that these new paragraphs meet the criteria in NUREG–0800, Subsection 13.5.2.1.

- STD COL 13.5-3-A Emergency Procedures Development

The last sentence of Section 13.5.2 in the ESBWR DCD Tier 2 is replaced with the following:

> Emergency Procedures are developed in accordance with Subsection 13.5.2.1.4.

ESBWR DCD Tier 2, Section 13.5.2 states that the applicant will develop emergency procedures. In COL FSAR Section 13.5.2, the applicant states that the new Subsection 13.5.2.1.4 was added to address the development of emergency procedures. The staff reviewed Subsection 13.5.2.1.4 and determined that it addresses the development of emergency procedures. The staff concluded that this new subsection meets the criteria in NUREG–0800, Subsection 13.5.2.1.

In FSAR Subsection 13.5.2.1.4, the applicant provides Commitment (COM 13.5-003), which states the following:

> The procedure development program, as described in the PGP [procedures generation package] for EOPs [emergency operating procedures], is submitted to the NRC at least three months prior to the planned date to begin formal operator training on the EOPs.

- EF3 COL 13.5-4-A Implementation of the Plant Procedures Plan

The COL Item EF3 COL 13.5-4-A replaces the fifth paragraph to supplement the ESBWR DCD Tier 2 with the following:

> A Plant Operations Procedures Development Plan is established in accordance with Subsection 13.5.2.1.

ESBWR DCD Tier 2, Section 13.5.2 states that the applicant will develop a Plant Operating Procedures Development Plan. In Fermi 3 COL FSAR Section 13.5.2, the applicant states that the new Subsection 13.5.2.1 was added to address the establishment of a Plant Operating Procedures Development Plan. The staff reviewed paragraph 13.5.2.1 and determined that it addresses the establishment of a Plant Operating Procedures Development Plan. The staff concluded that this new paragraph meets the criteria in NUREG–0800, Subsection 13.5.2.1.

- STD COL 13.5-5-A Procedures Included in Scope of Plan

The COL Item STD COL 13.5-5-A replaces the second paragraph of the subsection "Procedures for Handling of Heavy Loads" in the DCD Tier 2 with the following:

> The scope of procedures in the Plant Operating Procedures Development Plan is addressed in Subsection 13.5.2.1.

ESBWR DCD Tier 2, Section 13.5.2 states that the applicant will include procedures for handling heavy loads in the scope of the Plant Operating Procedures Development Plan. In Fermi 3 COL FSAR Section 13.5.2, the applicant states that the new Subsection 13.5.2.1 was added to address the scope of the Plant Operating Procedures Development Plan. The staff reviewed Subsection 13.5.2.1 and determined that it included procedures for handling heavy loads within the scope of the Plant Operating Procedures Development Plan. The staff concluded that this new subsection meets the criteria in NUREG–0800, Subsection 13.5.2.1.

- STD COL 13.5-6-A Procedures for Calibration, Inspection, and Testing

STD COL 13.5-6-A replaces the second sentence of the subsection "Procedures for Calibration, Inspection and Testing" to the DCD Tier 2 with the following:

> Surveillance procedures that cover safety-related logic circuitry are addressed in Subsection 13.5.2.2.6.3.

ESBWR DCD Tier 2, Subsection 13.5.2.1 states that the applicant will ensure that all portions of the safety-related logic circuitry are adequately covered in surveillance procedures described in GL 96-01, "Testing of Safety Related Logic Circuits." In Fermi 3 COL FSAR Section 13.5.2, the applicant states that the new Subsection 13.5.2.2.6.3 was added to address surveillance procedures that cover safety-related logic circuitry. The staff reviewed Subsection 13.5.2.2.6.3 and determined that it requires surveillance testing procedures to be written in a manner that adequately tests all portions of safety-related logic circuitry, as described in GL 96-01. The staff concluded that this new subsection meets the criteria in NUREG–0800, Subsection 13.5.2.1.

In addition, in FSAR Subsection 13.5.2.1, the applicant provides Commitment (COM 13.5-002), which states the following:

Operating procedures are developed at least six months prior to fuel load to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations.

Supplemental Information

- STD SUP 13.5-18 Classification of Procedures

STD SUP 13.5-18 states the following:

The classifications of operating procedures are:

- System Operating Procedures
- General Operating Procedures
- Abnormal (Off-Normal) Operating Procedures
- Emergency Operating Procedures
- Alarm Response Procedures.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should identify the different classifications of procedures (e.g., system procedures, general plant procedures, abnormal procedures, emergency operating procedures, and alarm procedures) that the operators will use in the CR and locally in the plant for plant operations. In FSAR Section 13.5.2, the applicant states that the classifications of operating procedures are system operating procedures, general operating procedures, abnormal (off-normal) operating procedures, emergency operating procedures, and alarm response procedures. The staff concluded that the applicant-has provided acceptable procedure classification information that meets the criteria in NUREG-0800, Subsection 13.5.2.1.

- STD SUP 13.5-19 System Operating Procedures

In FSAR Subsection 13.5.2.1.1, STD SUP 13.5-19 states the following:

Instructions for energizing, filling, venting, draining, starting up, shutting down, changing modes of operation, returning to service following testing or maintenance (if not contained in the applicable procedure), and other instructions appropriate for operation of systems are delineated in system procedures. System procedures contain check-off lists, where appropriate, which are prepared in sufficient detail to provide an adequate verification of the status of the system.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.1.1 that describes system operating procedures and their general format and content. The staff concluded that the applicant has provided descriptions of the system operating procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1.

- STD SUP 13.5-20 General Operating Procedures

In FSAR Subsection 13.5.2.1.2, STD SUP 13.5-20 states the following:

> General operating procedures provide instructions for performing integrated plant operations involving multiple systems, such as plant startup and shutdown. These procedures provide a coordinated means of integrating procedures together to change the mode of plant operation or to achieve a major plant evolution. Check-off lists are used for the purpose of confirming completion of major steps in proper sequence.
>
> Typical types of general operating procedures are described as follows:
>
> - Startup procedures provide instruction for starting the reactor from cold or hot conditions, establishing power operation, and recovering from reactor trips
> - Shutdown procedures guide operations during and following controlled shutdown or reactor trips, and include instructions for establishing or maintaining hot standby and safe or cold shutdown conditions, as applicable
> - Power operation and load changing procedures provide instruction for steady-state power operation and load changing.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., general plant procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.1.2 that describes general operating procedures and their general format and content. The staff concluded that the applicant has provided descriptions of general operating procedures that are acceptable and meet the criteria in NUREG–0800, Subsection 13.5.2.1.

- STD SUP 13.5-21 Abnormal Operating Procedures

In FSAR Subsection 13.5.2.1.3, STD SUP 13.5-21 states the following:

> Abnormal operating procedures for correcting abnormal conditions are developed for those events where system complexity might lead to operator uncertainty. Abnormal operating procedures describe actions to be taken during other than routine operations, which, if continued, could lead to either material failure, personnel harm, or other unsafe conditions.
>
> Abnormal procedures are written so that a trained operator knows in advance the expected course of events or indications that identify an abnormal situation and the immediate action to be taken.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., abnormal operating procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds new Subsection 13.5.2.1.3 that describes abnormal (off-normal) procedures and their

general format and content. The staff concluded that the applicant has provided descriptions of abnormal procedures that are acceptable and meet the criteria in NUREG–0800, Subsection 13.5.2.1.

- EF3 SUP 13.5-22 Emergency Operating Procedures

In FSAR Subsection 13.5.2.1.4, EF3 SUP 13.5-22 states the following:

> EOPs are procedures that direct actions necessary for the operators to mitigate the consequences of transients and accidents that cause plant parameters to exceed reactor protection system or ESF actuation setpoints.
>
> Emergency operating procedures include appropriate guidance for the operation of plant post-72-hour equipment, and are developed as appropriate per the guidance of:
>
> - NUREG-0737, "Clarification of TMI Action Plan Requirements," Items I.C.1 and I.C.9
> - The QAPD

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., emergency operating procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.1.4 that describes emergency operating procedures and their general format and content. The staff concluded that the applicant has provided descriptions of emergency operating procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1.

- STD SUP 13.5-23 Alarm Response Procedures

In FSAR Subsection 13.5.2.1.5, STD SUP 13.5-23 states the following:

> Procedures are provided for annunciators (alarm signals) identifying the proper operator response actions to be taken. Each of these procedures normally contains: a) the meaning of the annunciator or alarm, b) the source of the signal, c) any automatic plant responses, d) any immediate operator action, and e) the long range actions. When corrective actions are very detailed and/or lengthy, the alarm response may refer to another procedure.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., alarm response procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.1.5 that describes alarm response procedures and their general format and content. The staff concluded that the applicant has provided descriptions of alarm response procedures that are acceptable and meet the criteria in NUREG–0800, Subsection 13.5.2.1.

- EF3 SUP 13.5-24 Temporary Procedures

In FSAR Subsection 13.5.2.1.6, EF3 SUP 13.5-24 states the following:

> Temporary procedures are issued during the operational phase only when permanent procedures do not exist for the following activities: to direct operations during testing, refueling, maintenance, and modifications; to provide guidance in unusual situations not within the scope of the normal procedures; and to provide orderly and uniform operations for short periods when the plant, a system, or a component of a system is performing in a manner not covered by existing detailed procedures, or has been modified or extended in such a manner that portions of existing procedures do not apply.
>
> Temporary operating procedures are developed under established administrative guidelines. They include designation of the period of time during which they may be used and adhere to the QAPD and Technical Specifications, as applicable.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., temporary procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.1.6 that describes temporary procedures and their general format and content. The staff concluded that the applicant has provided descriptions of temporary procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1 and are therefore acceptable.

- STD SUP 13.5-25 Fuel Handling Procedures

In FSAR Subsection 13.5.2.1.7, STD SUP 13.5-25 states the following:

> Fuel handling operations, including fuel receipt, identification, movement, storage, and shipment, are performed in accordance with written procedures. Fuel handling procedures address, for example, the status of plant systems required for refueling; inspection of replacement fuel and control rods; designation of proper tools; proper conditions for spent fuel movement and storage; proper conditions to prevent inadvertent criticality; proper conditions for fuel cask loading and movement; and status of interlocks, reactor trip circuits, and mode switches. These procedures provide instructions for use of refueling equipment, actions for core alterations, monitoring core criticality status, accountability of fuel, and partial or complete refueling operations.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., fuel handling procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.1.7 that describes fuel handling procedures and their general format and content. The staff concluded that the applicant has provided descriptions of fuel handling procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1 and are therefore acceptable.

- STD SUP 13.5-26 Maintenance and Other Operating Procedures

In FSAR Subsection 13.5.2.2, STD SUP 13.5-26 states the following:

> The QAPD provides guidance for procedural adherence.

The technical review for STD SUP 13.5-26 is in SER Section 17.5.

- STD SUP 13.5-27 Plant Radiation Protection Procedures

In FSAR Subsection 13.5.2.2.1, STD SUP 13.5-27 states the following:

> The plant radiation protection program is contained in procedures. Procedures are developed and implemented for such things as: maintaining personnel exposures, plant contamination levels, and plant effluents ALARA; monitoring both external and internal exposures of workers, considering industry-accepted techniques; performing routine radiation surveys; performing environmental monitoring in the vicinity of the plant; monitoring radiation levels during maintenance and special work activities; evaluating radiation protection implications of proposed modifications; management of radioactive wastes for offsite shipment, disposal, and treatment; and maintaining radiation exposure records of workers and others.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., plant radiation protection procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.2.1 that describes plant radiation protection procedures and their general format and content. The staff concluded that the applicant has provided plant radiation protection procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1 and are therefore acceptable.

- STD SUP 13.5-28 Emergency Preparedness Procedures

In FSAR Subsection 13.5.2.2.2, STD SUP 13.5-28 states the following:

> A discussion of emergency preparedness procedures can be found in the Emergency Plan. A list of implementing procedures is maintained in the Emergency Plan.

The technical review for STD SUP 13.5-28 is in Section 13.3 of this SER.

- STD SUP 13.5-29 Instrument Calibration and Test Procedures

In FSAR Subsection 13.5.2.2.3, STD SUP 13.5-29 states the following:

> The QAPD provides a description of procedural requirements for instrumentation calibration and testing.

The technical review for STD SUP 13.5-29 is in SER Section 17.5.

- STD SUP 13.5-30 Chemistry Procedures

In FSAR Subsection 13.5.2.2.4, STD SUP 13.5-30 states the following:

> Procedures provided for chemical and radiochemical control activities include the nature and frequency of sampling and analyses; instructions for maintaining fluid quality within prescribed limits; the use of control and diagnostic parameters; and limitations on concentrations of agents that could cause corrosive attack, foul heat transfer surfaces or become sources of radiation hazards due to activation.
>
> Procedures are also provided for the control, treatment, and management of radioactive wastes and control of radioactive calibration sources.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., chemistry procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.2.4 that describes chemistry procedures and their general format and content. The staff concluded that the applicant has provided chemistry procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1 and are therefore acceptable.

- STD SUP 13.5-31 Radioactive Waste Management Procedures

In FSAR Subsection 13.5.2.2.5, STD SUP 13.5-31 states the following:

> Procedures for the operation of the radwaste processing systems provide for the control, treatment, and management of onsite radioactive wastes. These procedures are addressed in Section 13.5.2.1.1, System Operating Procedures.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., radioactive waste management procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.1.1 that describes radioactive waste management procedures and their general format and content. The staff concluded that the applicant has provided radioactive waste management procedures that meet the criteria in NUREG–0800 Subsection 13.5.2.1 and are therefore acceptable.

- STD SUP 13.5-33 Inspection Procedures

In FSAR Subsection 13.5.2.2.6.2, STD SUP 13.5-33 states the following:

> The QAPD provides a description of procedural requirements for inspections.

In FSAR Subsection 13.5.2.2.6.3, STD SUP 13.5-33 states the following:

> The QAPD provides a description of procedural requirements for surveillance testing. Surveillance testing procedures are written in a manner that adequately tests all portions of safety-related logic circuitry as described in Generic Letter 96-01, “Testing of Safety Related Logic Circuits.”

The technical review for STD SUP 13.5-33 is in Section 17.5 of this SER.

- STD SUP 13.5-34 Modification Procedures

In FSAR Subsection 13.5.2.2.6.4, STD SUP 13.5-34 states the following:

> Plant modifications and changes to setpoints are developed in accordance with approved procedures. These procedures control necessary activities associated with the modifications such that they are carried out in a planned, controlled, and orderly manner. For each modification, design documents such as drawings, equipment and material specifications, and appropriate design analyses are developed, or the as-built design documents are utilized. Separate reviews are conducted by individuals knowledgeable in both technical and QA requirements to verify the adequacy of the design effort.
>
> Proposed modifications that involve a license amendment or a change to Technical Specifications are processed as proposed license amendment request.
>
> Plant procedures impacted by modifications are changed to reflect revised plant conditions prior to declaring the system operable and cognizant personnel who are responsible for operating and maintaining the modified equipment are adequately trained.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., modification procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.2.6.4 that describes modification procedures and their general format and content. The staff concluded that the applicant has provided modification procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1 and are therefore acceptable.

- STD SUP 13.5-35 Heavy Load Handling Procedures

In FSAR Subsection 13.5.2.2.6.5, STD SUP 13.5-35 states the following:

> This topic is discussed in Subsection 9.1.5.8.

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., heavy-load handling procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant refers to the revised Subsection 9.1.5.8 that describes heavy-load handling procedures and their general format and content. The staff concluded that the applicant has provided heavy-load handling procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1 and are therefore acceptable.

- STD SUP 13.5-36 Material Control Procedures

In FSAR Subsection 13.5.2.2.7, STD SUP 13.5-36 states the following:

> The QAPD provides a description of procedural requirements for material control.

The technical review for STD SUP 13.5-33 is in Section 17.5 of this SER.

- STD SUP 13.5-37 Security Procedures

In FSAR Subsection 13.5.2.2.8, STD SUP 13.5-37 states the following:

> A discussion of security procedures is provided in the Security Plan.

The technical review for STD SUP 13.5-37 is in Section 13.6 of this SER.

- STD SUP 13.5-38 Refueling and Outage Planning Procedures

In FSAR Subsection 13.5.2.2.9, STD SUP 13.5-38 states the following:

> Procedures provide guidance for the development of refueling and outage plans, and as a minimum address the following elements:
>
> - An outage philosophy which includes safety as a primary consideration in outage planning and implementation
> - Separate organizations responsible for scheduling and overseeing the outage and provisions for an independent safety review team that would be assigned to perform final review and grant approval for outage activities
> - Control procedures, which address both the initial outage plan and safety-significant changes to schedule
> - Provisions that activities receive adequate resources
> - Provisions that defense-in-depth during shutdown and margins are not reduced or provisions that an alternate or backup system must be available if a safety system or a defense-in-depth system is removed from service
> - Provisions that personnel involved in outage activities are adequately trained including operator simulator training to the extent practicable, and training of other plant personnel, including temporary personnel, commensurate with the outage tasks they are to perform
> - The guidance described in NUMARC 91-06, “Guidelines for Industry Actions to Assess Shutdown Management,” to reduce the potential for loss of reactor coolant system boundary and inventory during shutdown conditions

NUREG–0800, Subsection 13.5.2.1 states that the applicant should describe the different classifications of procedures (e.g., refueling and outage planning procedures) and the general format and content of the different classifications of procedures. In FSAR Section 13.5.2, the applicant adds the new Subsection 13.5.2.2.9 that describes refueling and outage planning procedures and their general format and content. The staff concluded that the applicant has provided refueling and outage planning procedures that meet the criteria in NUREG–0800, Subsection 13.5.2.1 and are therefore acceptable.

- STD SUP 13.5-40 Procedure related to Refueling Cavity Integrity

In FSAR Subsection 13.5.2.2.10, STD SUP 13.5-40 states the following:

> Procedures will be established and implemented for:
>
> - Monitoring refueling cavity seal leakage,
> - Responding to refueling cavity and buffer pool drain down events, and
> - Performing periodic maintenance and inspection of the refueling cavity seal and the Main Steam and Isolation Condenser System plugs in accordance with vendor recommendations.

13.5.2.5 *Post Combined License Activities*

The applicant identifies the following commitments:

- Commitment (COM 13.5-001) – Develop procedures are developed prior to fuel loading to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations.

- Commitment (COM 13.5-002) – Develop operating procedures at least six months prior to fuel loading to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations.

- Commitment (COM 13.5-003) –Submit the procedure development program, as described in the PGP for EOPs, to the NRC at least three months prior to the planned date to begin formal operator training on the EOPs.

- Commitment (COM 13.5-004) – Develop an initial program based on service conditions, experience with comparable equipment and vendor recommendations is developed prior to fuel loading.

13.5.2.6 *Conclusion*

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

In addition, the staff compared the additional COL and supplemental information items in the COL application to the relevant NRC regulations, the guidance in Section 13.5 of NUREG-0800, and other NRC RGs. The staff's review concludes that the applicant has provided sufficient information to satisfy the requirements of the NRC regulations. The applicant has adequately addressed COL Items STD COL 13.5-2-A, 13.5-3-A, 13.5-5-A, and 13.5-6-A; Supplemental Items STD SUP 13.5-18, 13.5-19, 13.5-20, 13.5-21, 13.5-23, 13.5-25, 13.5-26, 13.5-27, 13.5-28, 13.5-29, 13.5-30, 13.5-31, 13.5-33, 13.5-34, 13.5-35, 13.5-36, 13.5-37, and 13.5-38;

and site-specific COL and Supplemental Items EF3 STD 13.5-4-A, EF3 SUP 13.5-22, and EF3 SUP 13.5-24 relating to plant procedures. These items can be considered closed.

13.6 Physical Security

13.6.1 Introduction

The Fermi 3 COL application describes the applicant's physical protection program, which is intended to meet the NRC regulations for the use of the design basis threat (DBT) to design safeguards systems to protect against acts of radiological sabotage as stated in 10 CFR 73.1 "Purpose and Scope." The overall purpose of the applicant's physical protection program is to provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety.

The physical protection program includes the design of a physical protection system that ensures the capabilities to detect, assess, interdict, and neutralize threats of radiological sabotage are maintained at all times. The applicant incorporates by reference the standard ESBWR design, which includes design of physical protection systems within the design of the vital island and vital structures, as described in the ESBWR DCD including topical report, NEDE-33389, "ESBWR Security Enhancements Report," NEDE-33390, "ESBWR Interim Compensatory Measures Assessment Report," and NEDE-33391, "The ESBWR Safeguards Assessment Report." Part 8 of the COL application, consisting of the Fermi Physical Security Plan (PSP), Training and Qualification Plan (T&QP), and Safeguards Contingency Plan (SCP), is referenced in Section 13.6 of the Fermi COL FSAR to describe the physical protection program and physical protection systems that are not addressed within the scope of the standard ESBWR design for meeting NRC performance and prescriptive requirements for physical protection stated in 10 CFR Part 73, "Physical Protection of Plants and Materials." The NRC staff evaluation of the physical protection program is provided in detail in the SGI version of the Fermi COL application Section 13.6 SER, and includes a complete set of the staff bases for its findings regarding the program. Due to security constraints, the NRC staff evaluation of the physical security protection program presented in this publicly-available SER does not include the same level of detail as the version. Those persons with the correct access authorization and need-to-know may view the safeguards information (SGI) version of the Fermi COL application Section 13.6 SER, which is located in the NRC's Secure LAN.

13.6.2 Summary of Application

Section 13.6 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 13.6 of the ESBWR DCD, Revision 10.

Part 8 – Safeguards/Security Plans

In a letter dated September 18, 2008, Detroit Edison submitted a PSP to the NRC as part of the COL application for proposed Fermi 3. In a letter dated October 1, 2009, Detroit Edison submitted Revision 1 to the PSP. In a letter dated June 30, 2010, Detroit Edison submitted Revision 2 to the PSP. In a letter dated February 14, 2011, Detroit Edison submitted Revision 3 to the PSP. In a letter dated May 24, 2011, Detroit Edison submitted Revision 4 to the PSP. In a letter dated September 23, 2011, Detroit Edison submitted Revision 5 to the PSP.

Additionally, in the Fermi COL FSAR Section 13.6, the applicant stated as follows:

COL Information Items

- STD COL 13.6-6-A

Site key control was addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.5. A key control program will be developed and implemented prior to the milestone for PSP implementation (Table 13.4-201).

- STD COL 13.6-7-A

Redundancy and equivalency of the central alarm station (CAS) and secondary alarm station (SAS) was addressed by the applicant through the Fermi PSP, Section 15.4.

- EF3 COL 13.6-8-A

The no single act requirement for the CAS and SAS was addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2. A description of the design of the CAS and SAS and analysis of single act security events is contained in the Fermi COL FSAR, Part 8, Appendix 8C.

- STD COL 13.6-9-A

The requirement for operational alarm response procedures was addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.3. Operating alarm response procedures will be developed and implemented in accordance with milestone defined in Subsection 13.5.2.1.

- STD COL 13.6-10-A

The requirement for operational surveillance test procedures was addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.8. The establishment of these surveillance test procedures and frequencies will be completed in accordance with the milestone for PSP implementation (Table 13.4-201).

- STD COL 13.6-11-A

Maintenance test procedures were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.8. The establishment of these testing and maintenance milestones will be completed in accordance with the milestone for PSP implementation (Table 13.4-201).

- STD COL 13.6-12-A

Operational response procedures to security events were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2. As part of the Security Plan, the applicant will develop an integrated response strategy to a confirmed security event that provides for manual actuation of plant systems by the operators to an evolving scenario necessitating escalating operator response. This action will be completed prior to the milestone for PSP implementation (Table 13.4-201).

- STD COL 13.6-13-A

Operational alarm response procedures were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.3. This action will be completed prior to the milestone for PSP implementation (Table 13.4-201).

- STD COL 13.6-14-A

Administrative controls to sensitive cabinets were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.5. Administrative procedures will be developed prior to the milestone for PSP implementation (Table 13.4-201) to control work being performed in cabinets containing the control circuitry for systems listed in Table 4-1 of NEDE-33391.

- STD COL 13.6-15-A

Administrative controls to sensitive equipment were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.5. Administrative procedures will be developed prior to the milestone for PSP implementation (Table 13.4-201) that will require two persons, each of whom are qualified to perform the intended work, to be present during the performance of any work on systems listed in Table 4-1 of NEDE-33391.

- EF3 COL 13.6-16-A

External bullet resisting enclosures (BREs) were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2. The applicant provided site arrangement drawings, which show the location of the external BREs and indicate the fields of fire from these locations. The applicant also described the level of protection provided to security personnel in the BREs from the effects of the equipment available to the adversaries utilizing the DBT toolkit. These items are contained in the PSP.

- EF3 COL 13.6-17-A

Site-specific locations of security barriers were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2. The applicant provided site arrangement drawings showing the site-specific locations of security barriers that are not part of the ESBWR Design, in the PSP. Additionally, prior to the milestone for PSP implementation (Table 13.4-201) the applicant will demonstrate that the security strategy described in the ESBWR Safeguards Assessment Report (NEDE-33391) remains valid.

- STD COL 13.6-18-A

Ammunition for armed responders was addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2. Prior to the milestone for PSP implementation (Table 13.4-201), the applicant will update the security plan with an analysis to determine if armed responders require ammunition greater than the amount normally carried.

- STD COL 13.6-19-A

Site-specific update of the ESBWR Safeguards Assessment Report was addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2. Prior to the milestone for PSP

implementation (Table 13.4-201), the applicant will analyze the ESBWR Safeguards Assessment Report to reflect site-specific location of engagement positions including fields of fire, to demonstrate that the security strategy can be implemented as described and the effectiveness of neutralization in the report can be achieved. The PSP will be updated based on this revised analysis.

- STD COL 13.6-20-A

Physical security ITAAC is covered in part by the ESBWR standard ITAAC that addresses the physical plant security systems and those features that are part of the standard design. The ESBWR standard ITAAC were addressed by the applicant through the ESBWR DCD Tier 1, which was incorporated by reference. The plant and site-specific physical security ITAAC not covered by the ESBWR standard design, are contained in the Fermi COL FSAR, Part 10, Section 2.2.1, "Site-Specific Physical Security ITAAC."

Supplemental Information

- STD SUP 13.6-1

In Subsection 13.6.2 of the Fermi 3 COL FSAR, the applicant provides supplemental information addressing the security plans which are submitted as separate licensing documents to fulfill the requirements of 10 CFR 52.79(a)(35) and (36). The applicant also states that the security plans meet the requirements of 10 CFR Part 73 and will be maintained in accordance with the requirements of 10 CFR 52.98 and protected in accordance with 10 CFR 73.21. The security plans are categorized as security safeguards information. The safeguards version of the Fermi COL application Section 13.6 SER, which included the evaluation of STD SUP 13.6-1, is located in the NRC's Secure Local Area Network.

- STD SUP 13.6-2

In Subsection 13.6.2 of the Fermi 3 COL FSAR, the applicant provides supplemental information addressing a commitment that has been added to administrative procedures to meet the requirements of 10 CFR 73.58 for managing the safety/security interface.

License Conditions

- Part 10, Section 3.6

The applicant proposed a license condition in Part 10 of the Fermi COL application, which provides milestones for implementing applicable portions of the Security Program.

13.6.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966 related to the ESBWR DCD. In addition, the relevant requirements of the Commission regulations for the physical security, and the associated acceptance criteria, are summarized in Subsection 13.6.1 of NUREG-0800.

The applicable regulatory requirements for physical protection are as follows:

- The provisions of 10 CFR 52.79(a)(35)(i) and (ii) require that information submitted for a COL describe how the applicant will meet the requirements of 10 CFR Part 73 and provide a description of the implementation of the PSP. The provisions of 10 CFR 52.79(a)(36)(i) through (v) require that the application include an SCP in accordance with the criteria set forth in Appendix C, "Nuclear Power Plant Safeguards Contingency Plans," to 10 CFR Part 73, and a T&QP in accordance with Appendix B of 10 CFR Part 73. The provisions also require that the applicant provide a description of the implementation of the SCP and the T&QP; and that the applicant protect the PSP, T&QP and SCP, and other related SGI in accordance with the requirements of 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

- The provisions of 10 CFR Part 73 include performance-based and prescriptive regulatory requirements that, when adequately met and implemented, provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety. A COL applicant must describe how it will meet the regulatory requirements of 10 CFR Part 73 that are applicable to nuclear power plants.

- The provisions of 10 CFR 52.79(a)(41) require an evaluation of the facility against the SRP in effect 6 months before the docket date of the application. The evaluation required by this section shall include an identification and description of all differences in design features, analytical techniques, and procedural measures proposed for a facility and those corresponding features, techniques, and measures given in the SRP acceptance criteria. Where a difference exists, the evaluation shall discuss how the proposed alternative provides an acceptable method of complying with the Commission's regulations, or portions thereof, that underlie the corresponding SRP acceptance criteria. The SRP is not a substitute for the regulations, and compliance is not a requirement.

The NRC staff used NUREG-0800, Subsection 13.6.1, Revision 1, dated June 15, 2010, to complete the physical security COL review.

Regulatory guidance documents, technical reports (TRs), accepted industry codes and standards that an applicant may apply to meet regulatory requirements include, but are not limited to the following:

- RG 5.7, Revision 1, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas," May 1980.

- RG 5.12, "General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials," November 1973.

- RG 5.44, Revision 3, "Perimeter Intrusion Alarm Systems," October 1997.

- RG 5.62, Revision 1 "Reporting of Safeguards Events," November 1987.

- RG 5.65, "Vital Area Access Controls, Protection of Physical Protection System Equipment and Key and Lock Controls," September 1986.

- RG 5.66, Revision 1, "Access Authorization Program for Nuclear Power Plant," July 2009.

- RG 5.68, "Protection Against Malevolent Use of Vehicles at Nuclear Power Plants," August 1994.

- RG 5.74, "Managing the Safety/Security Interface," March 2009.

- RG 5.75, "Training and Qualification of Security Personnel at Nuclear Power Reactor Facilities," June 2009.

- NRC letter dated April 9, 2009, NRC Staff Review of NEI 03-12 "Template for Security Plan, Training and Qualification, Safeguards Contingency Plan, [and Independent Spent Fuel Storage Installation Security Program]" (Revision 6) (ADAMS Accession No. ML090920528)

- SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria" October 28, 2005 (ADAMS Accession No. ML052770257)

The following documents include security-related or SGI and are not publically available:

- RG 5.69, "Guidance for the Application of Radiological Sabotage Design Basis Threat in the Design, Development, and Implementation of a Physical Security Protection Program that Meets 10 CFR 73.55 Requirements," June 2006.

- RG 5.76, "Physical Protection Programs at Nuclear Power Reactors," July 2009.

- RG 5.77, "Insider Mitigation Program." July 2009.

- NEI 03-12, Revision 6, "Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Independent Spent Fuel Installation Security Program"

- NUREG/CR-6190, "Update of NUREG/CR-6190 Material to Reflect Postulated Threat Requirements," March 27, 2003.

13.6.4 Technical Evaluation

The NRC staff reviewed Section 13.6 of the Fermi 3 COL FSAR and checked the referenced DCD to ensure that the combination of the DCD and the COL application represents the complete scope of information relating to this review topic.[1] The NRC staff's review confirmed that the information in the application and incorporated by reference addresses the required information relating to physical security. The results of the NRC staff's evaluation of the information incorporated by reference in the Fermi COL application are documented in NUREG-1966.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

The staff reviewed the information in the COL application:

COL Information Items

- STD COL 13.6-9-A

Operational alarm response procedures were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.3.

> Operating alarm response procedures will be developed and implemented in accordance with milestone defined in Subsection 13.5.2.1.

The staff reviewed STD COL 13.6-9-A and determined that it adequately references that the operational alarm response procedures were addressed and will be developed and implemented in accordance with the milestone defined in Subsection 13.5.2.1. The site protective strategy is in the facility implementing procedures, which were not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

- STD COL 13.6-10-A

Operational surveillance test procedures were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.8.

> The establishment of these surveillance test procedures and frequencies will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201).

The staff reviewed STD COL 13.6-10-A and determined that it adequately references that the operational surveillance test procedures and frequencies were addressed and will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201). The site protective strategy is in the facility implementing procedures, which were not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

- STD COL 13.6-11-A

Maintenance test procedures were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.8

> The establishment of these testing and maintenance milestones will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201).

The staff reviewed STD COL 13.6-11-A and determined that it adequately references that the maintenance test procedures were addressed and will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201). The site protective strategy is in the facility implementing procedures, which were not subject to NRC staff review

as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

- STD COL 13.6-12-A

Operational response procedures to security events were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2.

> As part of the Security Plan, the applicant will develop an integrated response strategy to a confirmed security event that provides for manual actuation of plant systems by the operators to an evolving scenario necessitating escalating operator response. This action will be completed prior to the milestone for PSP implementation (Table 13.4-201).

The staff reviewed STD COL 13.6-12-A and determined that it adequately references that the operational response procedures to security events were addressed and will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201). The site protective strategy is in the facility implementing procedures, which were not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

- STD COL 13.6-13-A

Operational alarm response procedures were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.3.

> This action will be completed prior to the milestone for Physical Security Plan implementation (Table 13.4-201).

The staff reviewed STD COL 13.6-13-A and determined that it adequately references that the alarm response procedures were addressed and will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201). The site protective strategy is in the facility implementing procedures, which were not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

- STD COL 13.6-14-A

Administrative controls to sensitive cabinets were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.5.

> Administrative procedures will be developed prior to the milestone for Physical Security Plan implementation (Table 13.4-201) to control work being performed in cabinets containing the control circuitry (contact elements) for the systems listed in Table 4-1 of NEDE–33391 (DCD Reference 13.6-6).

The staff reviewed STD COL 13.6-14-A and determined that it adequately references that the administrative controls to sensitive cabinets were addressed and will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201). The site protective strategy is in the facility implementing procedures, which were not subject to NRC

staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

- STD COL 13.6-15-A

Administrative controls to sensitive equipment were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.1.1.5.

> Administrative procedures will be developed prior to the milestone for Physical Security Plan implementation (Table 13.4-201) that will require two persons, each of whom are qualified to perform the intended work, to be present during the performance of any work on systems listed in Table 4-1 of NEDE-33391.

The staff reviewed STD COL 13.6-15-A and determined that it adequately references that the administrative controls to sensitive equipment procedures were addressed and will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201). The site protective strategy is in the facility implementing procedures, which were not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

- EF3 COL 13.6-16-A

External BREs were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2.

> A site arrangement drawing that shows the location of the external Bullet Resisting Enclosures and indicates the fields of fire from these locations is provided in the Physical Security Plan.
>
> A description of the level of protection provided to security personnel stationed in Bullet Resisting Enclosures (BREs) from the effects of the equipment available to the adversaries utilizing the Design Basis Threat (DBT) toolkit (defined in DCD Reference 13.6-8) is contained in the Physical Security Plan.

In RAI 13.06.01-21, the NRC staff asked the applicant how COL Information Item 13.6-16-A will be addressed. In its response dated August 30, 2010 (ADAMS Accession No. ML102440652), the applicant provided site arrangement drawings, which show the location of the external BREs and indicate the fields of fire from these locations. The applicant also described the level of protection provided to security personnel in the BREs from the effects of the equipment available to the adversaries utilizing the DBT toolkit. The applicant stated that Part 2 and Part 8 of the Fermi COL FSAR will be revised to incorporate this information.

The response to RAI 13.06.01-21, in regard to COL Information Item 13.6-16-A, was incomplete and the staff needed additional information from the applicant to reach a licensing decision. In RAI 13.06.01-52, the NRC staff asked follow up questions regarding locations of BREs. In its response dated November 19, 2010, the applicant provided clarifying information and stated that revised figures will be provided in the next Fermi combined license application (COLA) revision.

The response to RAI 13.06.01-52, in regard to COL Information Item 13.6-16-A, was incomplete and the staff needed additional information from the applicant to reach a licensing decision. In RAI 13.06.01-53, the staff requested additional information to evaluate and assess the proposed defensive strategy. In its response dated May 24, 2011, the applicant provided site arrangement drawings and information in its revised PSP, to clarify that the Fermi 3 defensive strategy satisfies the assumptions in the ESBWR Safeguards Assessment Report.

The NRC staff found the applicant response to RAI 13.06.01-53 acceptable, as it provides site arrangement drawings that specify the location of the external BREs and the fields of fire from these locations, as required by 10 CFR 52.79(d)(3), 10 CFR 52.79(a)(35)(i), and 10 CFR 73.55(b)(3)(ii). In Part 2, Revision 3 of the Fermi COL FSAR dated February 2011, the applicant provided a revised EF3 COL 13.6-16-A, by adding the additional information needed to support the licensing basis. Therefore, RAIs 13.06.01-21, 13.06.01-52 and 13.06.01-53 are closed.

- EF3 COL 13.6-17-A

Site-specific locations of security barriers were addressed by the applicant through the Fermi COL FSAR, Subsection 13.6.2.

> A site arrangement drawing that shows the location of the Protected Area (PA) fence, the isolation zone on either side of the PA fence, the Vehicle Barrier System (VBS), any Red Zone or Delay Fences, and any buildings or structures inside the PA that are not part of the Design is provided in the Physical Security Plan.
>
> Prior to the milestone for Physical Security Plan implementation (Table 13.4-201), a demonstration that the security strategy described in the ESBWR Safeguards Assessment Report (DCD Reference 13.6-6) remains valid will be conducted.

In RAI 13.06.01-21, the NRC staff asked the applicant how COL Information Item 13.6-17-A will be addressed. In its response dated August 30, 2010, the applicant provided a revised figure showing the site-specific locations of security barriers, which will be incorporated into Part 2 and Part 8 of the Fermi COL FSAR. In Table 13.4-201, the applicant included a commitment [COM 13.4-017] to implement the PSP and demonstrate that the security strategy described in the ESBWR Safeguards Assessment Report (NEDE-33391) remains valid prior to fuel on site.

The NRC staff finds the response to RAI 13.06.01-21, in regard to COL Information Item 13.6-17-A, acceptable as it provides a commitment to add a site arrangement drawing to the PSP to show the location of the protected area (PA) fence, isolation zone on either side of the fence, the vehicle barrier system (VBS), any red zone or delay fences, and any buildings or structures inside the PA that are not part of the design.

In a letter dated February 14, 2011, the applicant provided a revised PSP, Revision 3 (ADAMS Accession No. ML110600508), adding a site arrangement drawing that shows the location of the PA fence, isolation zone on either side of the fence, the VBS, any red zone or delay fences, and any buildings or structures inside the PA that are not part of the design. Therefore, this portion of RAI 13.06.01-21 is closed.

In addition, the applicant provided a revised FSAR Part 2 and Part 10, Revision 3, both dated February 2012. The COL applicant identified a milestone for demonstrating that the security strategy described in the Safeguards Assessment Report remains valid prior to receipt of fuel on site, in accordance with the ESBWR design and 10 CFR 73.55(a)(4). Therefore, this RAI 13.06.01-21 is closed.

- STD COL 13.6-18-A

Ammunition for armed responders was addressed by the applicant through the Fermi COL FSAR Subsection 13.6.2.

> Prior to the milestone for Physical Security Plan implementation (Table 13.4-201), the security plan will be updated with an analysis to determine if armed responders require ammunition greater than the amount normally carried to provide reasonable assurance of successful engagement of adversaries from various engagement positions, including the development of necessary procedures to assure adequate ammunition is available.

The staff's evaluation of STD COL 13.6-18-A is contained in Subsection 13.6.4.1.9 of this SER. The staff reviewed STD COL 13.6-18-A and determined that it adequately references that an analysis to determine if ammunition greater than the amount that is normally carried and the development of necessary procedures will be completed in accordance with the milestone for the Physical Security Plan implementation table (Table 13.4-201).

The site protective strategy is in the facility implementing procedures, which were not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

- STD COL 13.6-19-A

Site-specific update of the ESBWR Safeguards Assessment Report was addressed by the applicant through the Fermi COL FSAR Subsection 13.6.2.

> Prior to the milestone for Physical Security Plan implementation (Table 13.4-201), the security plan will be updated with an analysis of the ESBWR Safeguards Assessment Report (DCD Reference 13.6-6) reflecting site-specific locations of engagement positions including fields of fire. This applies for the external Bullet Resisting Enclosures as well as any internal positions that have external engagement responsibilities. This will include an implementation analysis of the Security Strategy described in the report, focusing on the effectiveness of neutralization of adversaries before significant radiological sabotage can occur.

In RAI 13.06.01-1, the NRC staff asked the applicant to describe how the specific security features identified in NEDE-33391 will be tracked, incorporated, verified, and demonstrated for the Fermi 3 physical protection program. In its response dated May 3, 2010, the applicant stated that the latest revision of NEDE-33391, ESBWR "Safeguards Assessment Report" will be used to develop a strategy that will be tested and implemented to protect Fermi 3 against the adversary characteristics of the DBT. The assumptions in the report will be analyzed when

developing the protective strategy. In RAI 13.06.01-51, the NRC staff asked for follow up information on how the strategy for the co-located site (Fermi 2) will be reflected in the revision of the Safeguards Assessment Report.

In its response, dated September 2, 2010, the applicant stated that although the response to RAI 13.06.01-1 addressed only the ESBWR Safeguards Assessment Report (NEDE-33391), it is understood that since Fermi 2 and Fermi 3 are to be co-located within a single PA, it will be necessary for the site protective strategy to include the plant specific security features of both plants. As such, the ESBWR Safeguards Assessment Report and similar information for Fermi 2 (e.g., target sets and defensive strategy) will be reviewed, assessed, modified, and verified in the development of the site protective strategy.

Development of the site protective strategy is a necessary milestone in the implementation of the Fermi Security Program. The applicant stated that the milestone for the development of the site protective strategy, as well as the major changes (modifications or revisions) resulting from the development of the protective strategy will be communicated to the NRC and tracked in the Commitment Tracking Program. The applicant stated that it will submit, within 12 months after issuance of a COL, a schedule for implementation of the Fermi Security Program that supports planning for and conduct of NRC inspections. The applicant also stated that the schedule will be updated every 6 months until 12 months before scheduled fuel load, and every month thereafter until either the Fermi Security Program has been fully implemented or the plant has been placed in commercial service, whichever comes first. The staff evaluation of the proposed license condition is set forth below, and the staff-approved version of the condition is documented in SER Subsection 13.6.5 as License Condition 13.6-1.

The NRC staff found the applicant responses to RAI 13.06.01-1 and RAI 13.06.01-51 acceptable, as they provide in their FSAR, STD COL 13.6-19-A a commitment to update the PSP with the analysis from the ESBWR Safeguards Assessment Report and the protective strategy to include plant specific features of both units, as required by 10 CFR 73.55(b). Therefore, RAIs 13.03.01-1 and 13.06.01-51 are closed.

- STD COL 13.6-20-A

Physical security ITAAC is covered in part by the ESBWR standard ITAAC that address the physical plant security systems and those features that are part of the standard design.

> Features of the physical security system are covered, in part, by the standard ESBWR design, while other features are plant and site specific. Accordingly, the ESBWR standard ITAAC cover the physical plant security system and address those features that are part of the standard design. NRC guidance provides suggested ITAAC that cover both the standard design and the plant and site specific features. The plant and site-specific Physical Security ITAAC not covered by the ESBWR Tier 1, Section 2.19, are contained in Part 10, “ITAAC”, Section 2.2.1 “Site-Specific Physical Security ITAAC.”

In a supplemental response to RAI 19.03-38 (ADAMS Accession No. ML11229A767), dated August 16, 2011, the applicant identified the following commitments to track implementation of the Physical Security Program, the Safeguards Contingency Program, and the Training and Qualification Program:

1. Physical Security Program - Implemented prior to fuel onsite [COM 13.4-017]
2. Safeguards Contingency Program - Implemented prior to fuel onsite [COM 13.4-017]
3. Training and Qualification Program - Implemented prior to fuel onsite [COM 13.4-017]

In Fermi 3 FSAR Part 2, Revision 4, dated February 2012, the applicant revised the Security Programs listed in Table 13.4-201 that were addressed by a license condition required by 10 CFR 73.55(a)(4). In Part 10, Revision 3, dated February 2012; Section 3 was also revised to include those items listed in FSAR Table 13.4-201 where license conditions were proposed as the implementation requirement.

License Conditions

- Part 10, Section 3.6

In response to NRC Letter Number 63, dated August 16, 2011 (ADAMS Accession No. ML11229A767), the applicant proposed a license condition in Part 10 of the Fermi COL application that provides milestones for implementing applicable portions of the Security Program. Specifically, the applicant proposed the following:

> The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first.

The applicant followed the recommendations of the SRM dated February 22, 2006, on SECY-05-0197, in formulating the above license condition. The Staff, however, notes that the Commission, in its 2012 decision in the *Vogtle* proceeding, approved a license containing a different condition governing the same subject.

Condition 2. D.(11) of the Southern Nuclear Operating Company's, Vogtle Electric Generating Plant, Unit 3, COL (ADAMS Accession No. ML112991110), which governs the Operational Program Implementation Schedule, states:

> "No later than 12 months after issuance of the COL, SNC shall submit to the Director of NRO, or the Director's designee, a schedule for implementation of the operational programs listed in FSAR Table 13.4-201, including the associated estimated date for initial loading of fuel. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until all the operational programs listed in FSAR Table 13.4-201 have been fully implemented."

The staff will use Vogtle Condition 2.D.(11) as a template for the corresponding condition in a Fermi COL, should the Commission grant the application.

13.6.4.1 *Physical Security Plan*

The applicant submitted in Part 8 of the COL application the Fermi 3 PSP, T&QP and SCP to meet the requirements of 10 CFR 52.79(a)(35) and (36). Part 2, FSAR, Chapter 13, Section 13.6 references Fermi 3 PSP, T&QP, and SCP in describing the licensing basis for establishing a physical protection program, design of a physical protection system, and security organization, that will have as its objective to provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety. The PSP submitted by Fermi 3 makes references to 10 CFR 50.34(c) and (d). Since this is a Combined Operating License Application which includes a common protected area (PA) for both operating and new reactors, the references should include 10 CFR 52.79(a)(35)(i), (36)(i) and (36)(ii). This reflects a template error, and both references require submission of the same information. The staff evaluated the Fermi 3 Security Plans only.

Security plans must describe how the applicant will implement Commission requirements and those site-specific conditions that affect implementation, as required by 10 CFR 73.55(c)(1)(i) and 10 CFR 73.55(c)(1)(ii).

The requirements are provided in 10 CFR 73.55(c), and (d) to establish, maintain, and implement a PSP to meet the requirements of 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors against Radiological Sabotage," and 10 CFR Part 73, Appendices B and C. The applicant must show establishment and maintenance of a security organization, the use of security equipment and technology, the training and qualification of security personnel, the implementation of predetermined response plans and strategies, and the protection of digital computer and communication systems and networks. The applicant must have a management system for development, implementation, revision, and oversight of security implementing procedures. The approval process for implementing security procedures will be documented.

In RAI 13.06.01-7, the NRC staff questioned the applicant's intended scope of the submitted PSP, T&QP, and SCP. In its response, the applicant stated that the PSP, T&QP, and SCP will apply to both Fermi 2 and Fermi 3 and will replace the existing NRC-approved PSP for Fermi 2 at some point in time not yet identified. In RAI 13.06.01-48, the NRC staff requested additional details on an implementation schedule for the Fermi PSP. In its response, the applicant stated a milestone for the implementation of the Fermi PSP, as a replacement for the Fermi 2 PSP, which will be communicated to the NRC and tracked in the Commitment Tracking Program. The applicant will submit, within 12 months after issuance of a COL, a schedule for implementation of the Fermi Security Program that supports planning for and conduct of NRC inspections.

This is being documented in Subsection 13.6.5 as License Condition 13.6-1. The NRC staff finds the responses to RAI 13.06.01-7 and RAI 13.06.01-48 acceptable, as they provide a license condition on implementation of the Fermi Security Program, which is acceptable for the reasons set forth in Subsection 13.6.5 of this SER. Therefore, RAI 13.06.01-7 and 13.06.01-48 are closed.

The NRC staff has reviewed the applicant's description in PSP Section 1 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent

with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(c) and (d), and therefore is acceptable.

13.6.4.1.1 Introduction and Physical Facility Layout

The provisions of 10 CFR 52.79(a)(35) require that the application include a physical security plan describing how the applicant will meet the requirements of 10 CFR Part 73 (and 10 CFR Part 11, "Criteria and Procedures for Determining Eligibility for Access to or Control over Special Nuclear Material," if applicable, including the identification and description of jobs as required by 10 CFR 11.11(a) of this chapter, at the proposed facility). The plan must list tests, inspections, audits, and other means to be used to demonstrate compliance with the requirements of 10 CFR Parts 11 and 73, if applicable; and a description of the implementation of the physical security plan.

> The provisions of 10 CFR 52.79(a)(36) require that the application contain: (i) a safeguards contingency plan in accordance with the criteria set forth in Appendix C to 10 CFR Part 73. The safeguards contingency plan shall include plans for dealing with threats, thefts, and radiological sabotage, as defined in 10 CFR Part 73 of this chapter, relating to the special nuclear material and nuclear facilities licensed under this chapter and in the applicant's possession and control. Each application for this type of license shall include the information contained in the applicant's safeguards contingency plan. (Implementing procedures required for the Emergency Plan need not be submitted for approval.)
>
> (ii) A training and qualification plan in accordance with the criteria set forth in Appendix B to 10 CFR Part 73.
>
> (iii) A cyber security plan in accordance with the criteria set forth in 10 CFR 73.54 of this chapter;
>
> (iv) A description of the implementation of the safeguards contingency plan, training and qualification plan, and cyber security plan; and
>
> (v) Each applicant who prepares a physical security plan, a safeguards contingency plan, a training and qualification plan, or a cyber security plan, shall protect the plans and other related Safeguards Information against unauthorized disclosure in accordance with the requirements of 10 CFR 73.21 of this chapter.

The provisions of 10 CFR 52.79(a)(44) require that the application contain a description of the fitness-for-duty (FFD) program required by 10 CFR Part 26, "Fitness for Duty Programs," and its implementation.

Requirements are established in 10 CFR 73.55(c)(2) to ensure protection of SGI against unauthorized disclosure in accordance with 10 CFR 73.21. The applicant's submittal in Part 8 of the COL application (page 1) acknowledges that the PSP the T&QP, and the SCP discuss specific features of the physical security system or response procedures and are SGI.

Section 1 of the PSP describes the applicant's commitment to satisfying 10 CFR 50.34(c) and (d) and 10 CFR Part 73 by submitting a PSP, and to controlling the PSP and appendices as SGI according to 10 CFR 73.21.

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3.b, require a description of the physical layout of the site.

Section 1.1 of the PSP provides descriptions of location, site layout, and facility configuration. The PSP describes the physical structures and their locations on the site, description of the PA, and a description of the site in relation to nearby towns, roads, and other environmental features important to the coordination of response operations. The plant layout includes identification of main and alternate entry routes for law enforcement assistance forces and the location of control points for marshaling and coordinating response activities.

In addition, Section 1.1 of the Fermi COL application describes general plant descriptions that include details of the 16-to 80-kilometer (10- to 50-mile) radius of the geographical area of the Fermi 3 site, a site area map, and general plant and site descriptions. Fermi COL FSAR, Chapter 2, references the ESBWR Design Certification for the principal design and operating characteristics for the design and construction of Fermi 3. Part 1, General Information, of the Fermi COL application describes the name of the applicant and principal business locations.

The NRC staff has reviewed the facility physical layout provided in Section 1.1 of the PSP and as supplemented by Fermi COL FSAR. The NRC staff determined that the applicant included site-specific conditions that affect the applicant's capability to satisfy the requirements of a comprehensive PSP. The applicant has adequately described the physical structures and their locations on site and the site in relation to nearby towns, roads, and other environmental features important to the effective coordination of response operations. The applicant described the main and alternate entry routes for law-enforcement assistance forces and the location of control points for marshaling and coordinating response activities in the site-specific law enforcement response plan. The NRC staff concludes that the applicant's security plans have met the requirements for content of a PSP as stated above. Therefore, the NRC staff finds the "Facility Layout" described in the PSP and the Fermi COL FSAR is acceptable.

13.6.4.1.2 Performance Objectives

The provisions of 10 CFR 73.55(b)(1) require, in part, that the applicant shall establish and maintain a physical protection program with an objective to provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety. The provisions of 10 CFR 73.55(b)(2) establish, in part, the requirement to protect a nuclear power reactor against the DBT of radiological sabotage as described in 10 CFR 73.1. The provisions of 10 CFR 73.55(b)(3)(i) and 10 CFR 73.55(b)(3)(ii) require the applicant to establish a physical protection program designed to ensure the capabilities to detect, assess, interdict, and neutralize threats up to and including the DBT of radiological sabotage, as stated in 10 CFR 73.1, are maintained at all times, and to provide defense-in-depth, supporting processes, and implementing procedures that will ensure the effectiveness of the physical protection program.

Section 2 of the PSP outlines regulatory requirements for the establishment and maintenance of an onsite physical protection system, security organization, and integrated response capability.

As part of the objective, the security program design incorporates supporting processes such as defense-in-depth principles, including diversity and redundancy, to ensure that no single event can disable the security response capability. The physical protection systems and programs described in the PSP are designed to protect against the DBT of radiological sabotage in accordance with the requirements of 10 CFR 73.55(a) through (r) or equivalent measures that meet the same high assurance objectives provided by paragraph (a) through (r). The applicant proposes to use the corrective action program to track, trend, correct and prevent recurrence of failures and deficiencies in the physical protection program.

The NRC staff has reviewed the applicant's description in PSP Section 2, for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(b), and therefore is acceptable.

13.6.4.1.3 Performance Evaluation Program

Requirements are established in 10 CFR 73.55(b)(4) through (b)(11) for the applicant to analyze and identify site-specific conditions, establish programs, plans, and procedures that address performance evaluations, access authorization, cyber security, insider mitigation, fitness for duty (FFD), corrective actions, and operating procedures. Regulations in 10 CFR 73.55(b)(6) prescribe specific requirements to establish, maintain, and implement a performance evaluation program in accordance with 10 CFR Part 73, Appendix B, Section VI for implementation of the plant protective strategy.

Section 3.0 of the PSP describes that drills and exercises, as discussed in the T&QP, will be used to assess the effectiveness of the contingency response plan and the effectiveness of the applicant's response strategy. Other assessment methods include formal and informal exercises or drills, self-assessments, and internal and external audits and evaluations.

The performance evaluation processes and criteria that assess the effectiveness of the security program, including adequate protection against radiological sabotage, will be established in facility procedures and the deficiencies identified will be managed through the corrective action program.

Section 3.0 of the PSP references Section 4.0 of the T&QP, which provides additional details related to the performance evaluation of security personnel in accordance with 10 CFR Part 73 Appendix B Section VI. Section 4.0 of the T&QP includes provisions to conduct security force tactical drills and force-on-force exercises to evaluate the effectiveness of security systems and the response performances of security personnel. In addition, Section 17 of the PSP describes additional detail regarding the applicant's processes for reviews, evaluations and audits that will complement the performance evaluation program.

The NRC staff has reviewed the applicant's description in PSP Section 3 and the T&QP Section 4 (evaluated separately) for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(b)(6), and therefore is acceptable.

13.6.4.1.4 Establishment of Security Organization

The provisions of 10 CFR 73.55(d) establish requirements to describe a security organization, including the management system for oversight of the physical protection program. The security organization must be designed, staffed, trained, qualified, periodically re-qualified, and equipped to implement the physical protection program as required by 10 CFR 73.55(b) and 10 CFR Part 73, Appendices B and C.

As explained below, Section 4.0 of the PSP describes how the applicant meets the requirements of 10 CFR 73.55(d)(1).

Security Organization Management

Section 4.1 of the PSP describes the organization's management structure. The PSP establishes that the security organization is a critical component of the physical protection program and is responsible for the effective application of engineered systems, technologies, programs, equipment, procedures, and personnel that are necessary to detect, assess, interdict, and neutralize threats up to and including the DBT of radiological sabotage. The security organization may be proprietary, contract, or other qualified personnel.

The PSP describes that the organization will be staffed with appropriately trained and equipped personnel, in a command structure with administrative controls and procedures, to provide a comprehensive response. Section 4.1 of the PSP also describes the roles and responsibilities of the security organization. The PSP provides that at least one full time, dedicated security shift supervisor, who has the authority for command and control of all security operations, is on site at all times.

The security force implementing the security functions as described in this section of the plan will either be a proprietary force, or contractor or other qualified personnel. The training and qualification provisions are described in the T&QP.

The NRC staff has reviewed the applicant's description in PSP Sections 4 and 4.1 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Section 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(d) and is, therefore, acceptable.

13.6.4.1.5 Qualification for Employment in Security

The requirements of 10 CFR 73.55(d)(3) state, in part, that the applicant may not permit any individual to implement any part of the physical protection program unless the individual has been trained, equipped and qualified to perform assigned duties and responsibilities in accordance with Appendix B to 10 CFR Part 73 and the applicant's T&QP.

Section 5 of the PSP describes that employment qualifications for members of the security force are delineated in the T&QP.

The NRC staff has reviewed the applicant's description in PSP Section 5 for the implementation of the site-specific physical protection program in accordance with Commission regulations and

NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(d)(3) and therefore is acceptable.

13.6.4.1.6 Training of Facility Personnel

Consistent with requirements in 10 CFR 73.55(d)(3), 10 CFR 73.56, "Personnel Access Authorization Requirements for Nuclear Power Plants," and 10 CFR Part 73, Appendix B, Section VI.C.1, all personnel who are authorized unescorted access to the applicant's PA receive training, in part, to ensure that they are trained to perform their assigned duties and responsibilities in the event of a security incident. Individuals assigned to perform security-related duties or responsibilities, such as, but not limited to, material searches and vehicle escort are trained and qualified in accordance with the T&QP to perform these duties and responsibilities and to ensure that each individual has the minimum knowledge, skills, and abilities required for effective performance of assigned duties and responsibilities.

Section 6 of the PSP describes the training provided for all personnel who have been granted unescorted access to the applicant's PA.

The NRC staff has reviewed the applicant's description in PSP Section 6 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.56 and 10 CFR Part 73, Appendix B, and therefore is acceptable.

13.6.4.1.7 Security Personnel Training

The provisions of 10 CFR 73.55(d) require that all security personnel are trained and qualified in accordance with 10 CFR Part 73, Appendix B, Section VI prior to performing their duties.

Section 7 of the PSP describes that all security personnel are trained, qualified and perform tasks at levels specific for their assignments in accordance with the applicant's T&QP.

The NRC staff has reviewed the applicant's description in PSP Section 7 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP and the T&QP meets the requirements of 10 CFR 73.55(d) and therefore is acceptable. The NRC staff's review of the applicant's T&QP is located in Subsection 13.6.4.2 of this SER.

13.6.4.1.8 Local Law Enforcement Liaison

The following requirement is stated in 10 CFR 73.55(k)(9), "To the extent practicable, licensees shall document and maintain current agreements with applicable law enforcement agencies to include estimated response times and capabilities." In addition, 10 CFR 73.55(m)(2) requires that the periodic licensee reviews of the physical protection program required by that section

include an audit of the effectiveness of the response commitments by local, State and Federal law enforcement authorities.

Section 8 of the PSP provides a detailed discussion of the ongoing relationship with LLEAs. The plans addressing response, communication methodologies and protocols, command and control structures and marshaling locations are located in the operations procedures, emergency plan procedures and the site-specific law enforcement response plan. The law enforcement response plan is reviewed biennially concurrent with the PSP effectiveness review.

The NRC staff has reviewed the applicant's description in PSP Section 8 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent-with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(k)(9) and 10 CFR 73.55(m)(2), and therefore is acceptable.

13.6.4.1.9 Security Personnel Equipment

The requirements of 10 CFR 73.55(d)(3) state, in part, that the applicant may not permit any individual to implement any part of the physical protection program unless the individual has been trained, equipped and qualified in accordance with 10 CFR Part 73, Appendix B and the T&QP. Regulations in 10 CFR Part 73, Appendix B, Section VI.G.2(a) state, in part, that the applicant must ensure that each individual is equipped or has ready access to all personal equipment or devices required for the effective implementation of the NRC-approved security plans, the applicant's protective strategy, and implementing procedures. The provisions of 10 CFR Part 73, Appendix B, Sections VI.G.2(b) and (c) delineate the minimum equipment requirements for security personnel and armed response personnel.

The applicant addresses STD COL 13.6-18-A as follows: Section 9 of the PSP describes the equipment, including armament, ammunition and communications equipment that is provided to security personnel in order to ensure that security personnel are capable of performing the function stated in the Commission-approved security plans, applicant's protective strategy, and implementing procedures.

The NRC staff has reviewed the applicant's description in PSP Section 9 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(d)(3) and Appendix B, Section VI.G.2, and therefore is acceptable.

13.6.4.1.10 Work Hour Controls

The provisions of 10 CFR Part 26, "Fitness for Duty Programs," Subpart I, "Managing Fatigue," establish the requirements for managing fatigue. The provisions of 10 CFR 26.205, "Work Hours," establish requirements for work hours. The provisions of 10 CFR 26.205(a) require that any individual who performs duties identified in 10 CFR 26.4(a)(1) through (a)(5) shall be subject to the requirements of 10 CFR 26.205(a).

Section 10 of the PSP describes how the applicant will implement work hour controls in accordance with 10 CFR Part 26, Subpart I, and that site procedures shall describe performance objectives and implementing procedures.

The NRC staff's review of the FFD program is found in Section 13.7 of this SER.

13.6.4.1.11 Physical Barriers

The following requirements are established in 10 CFR 73.55(e): "Each licensee shall identify and analyze site-specific conditions to determine the specific use, type, function, and placement of physical barriers needed to satisfy the physical protection program design requirements of 10 CFR 73.55(b)." (1) The applicant shall: (i) "Design, construct, install and maintain physical barriers as necessary to control access into facility areas for which access must be controlled or denied to satisfy the physical protection program design requirements of paragraph (b) of this section." 10 CFR 73.55(b)(3)(ii) states that the physical protection program must: "Provide defense-in-depth through the integration of systems, technologies, programs, equipment, supporting processes, and implementing procedures as needed to ensure the effectiveness of the physical protection program."

Section 11 of the PSP provides a general description of how the applicant will implement its program for physical barriers, and that this implementation is in accordance with the performance objectives and requirements of 10 CFR 73.55(b).

Owner Controlled Area (OCA) Barriers

Section 11.1 of the PSP describes the use of OCA barriers at the site.

Vehicle Barriers

PSP Subsections 11.2.1 and 11.2.2 provides for vehicle control measures to protect against the DBT of radiological sabotage. The staff has verified that such measures are in accordance with site-specific analysis. Further, the staff has determined that these measures integrate systems, technologies, programs, supporting processes, and implementing procedures to provide defense-in-depth against the DBT land vehicle bomb assault. The staff has also determined that such measures provide for a VBS at a stand-off distance adequate to protect personnel, equipment, and systems necessary to prevent significant core damage and spent fuel sabotage against the effects of such an assault. Further, the staff confirmed that the applicant's PSP provides that the inspection, monitoring, and maintenance of the VBS are included in facility procedures. In view of the above, the staff concludes that the PSP identifies measures taken to provide high assurance that a land vehicle bomb assault can be defended against.

Accordingly, the staff concludes that the proposed vehicle control measures are consistent with the physical protection program design requirements of 10 CFR 73.55(b)(3)(ii) and 10 CFR 73.55(e)(10)(i).

Waterborne Threat Measures

The provisions of 10 CFR 73.55(e)(10)(ii) require the applicant to "identify areas from which a waterborne vehicle must be restricted, and where possible, in coordination with local, State, and Federal agencies having jurisdiction over waterway approaches, deploy buoys, markers, or

other equipment. In accordance with the site-specific analysis, provide periodic surveillance and observation of waterway approaches and adjacent areas."

In RAI 13.06.01-12, the NRC staff requested that the applicant provide further information with regard to the waterborne threat protection measures. In RAI 13.06.01-49, the NRC staff asked follow up questions regarding the surveillance and observation of waterway approaches, specifically during the winter months. In its response (ADAMS Accession No. ML102570700), the applicant addressed the establishment of a permanent security zone by the U.S. Coast Guard and referenced other sections of the PSP that discuss additional measures that are always in place.

The staff concludes that Subsection 11.2.3 of the PSP describes protection measures adequate to protect the Fermi 3 site against waterborne threats.

Accordingly, the NRC staff found the responses to RAI 13.06.01-12 and RAI 13.06.01-49 acceptable, as they provide details on how the applicant meets the regulatory requirements of 10 CFR 73.55(e)(10)(ii). Therefore, RAI 13.06.01-12 and 13.06.01-49 are closed.

Protected Area Barriers

The provisions of 10 CFR 73.55(e)(8)(i) require that the PA perimeter must be protected by physical barriers that are designed and constructed to: (1) limit access to only those personnel, vehicles, and materials required to perform official duties; (2) channel personnel, vehicles, and materials to designated access control portals; and (3) be separated from any other barrier designated as a vital area physical barrier, unless otherwise identified in the PSP.

The descriptions of the PA barrier are provided in PSP Section 11.3.

Section 11.3 of the PSP describes the extent to which the PA barrier at the perimeter is separated from a vital area/island barrier. The security plan identifies where the PA barrier is not separated from a vital area barrier, as required by 10 CFR 73.55(e)(8)(i)(c).

Section 11.3 of the PSP describes isolation zones. As required in 10 CFR 73.55(e)(7), the isolation zone is maintained in outdoor areas adjacent to the PA perimeter barrier and is designed to ensure the ability to observe and assess activities on either side of the PA perimeter.

These descriptions meet the definitions of physical barrier and PA in 10 CFR 73.2 and the requirements of 10 CFR 73.55(e)(8).

Vital Area Barriers

The provisions of 10 CFR 73.55(e)(9) require that "Vital equipment must be located only within vital areas, which must be located within a protected area so that access to vital equipment requires passage through at least two physical barriers, except as otherwise approved by the Commission and identified in the security plans." In addition, 10 CFR 73.55(e)(5) requires that the physical barriers to access of certain vital areas shall be bullet resisting.

Section 11.4 of the PSP describes that vital areas are restricted access areas surrounded by physical barriers with the capability to restrict access to only authorized individuals.

In RAI 13.06.01-17, the NRC staff asked for clarification on the protection of the secondary alarm station as required by 10 CFR 73.55(i)(4)(iii). In its response dated May 17, 2010, the applicant stated that Section 11.4 and Appendix A of the PSP would be revised to be consistent with Section 15.4 of the PSP, which states that both the CAS and SAS shall be constructed to meet the standard of 10 CFR 73.55 (i)(4)(iii).

In Revision 2 of the Fermi PSP dated June 30, 2010, the applicant provided the necessary information to satisfy the requirements of 10 CFR 73.55(i)(4)(iii).

The NRC staff finds the response to RAI 13.06.01-17 acceptable as it provides clarification on how the applicant meets requirements for the secondary alarm station, consistent with 10 CFR 73.55(i)(4)(iii). Therefore, this RAI 13.06.01-17 is closed. Section 11.4 also describes that the reactor CR, CAS, SAS and the location within which the last access control function for access to the PA is performed, must be bullet resisting. Accordingly, the staff finds all vital areas are constructed in accordance with established regulatory requirements.

Target Set Equipment

The provisions of 10 CFR 73.55(f) require the following: "The licensee shall document and maintain the process used to develop and identify target sets, to include the site-specific analyses and methodologies used to determine and group the target set equipment or elements. The licensee shall consider cyber attacks in the development and identification of target sets. Target set equipment or elements that are not contained within a protected or vital area must be identified and documented consistent with the requirements in 10 CFR 73.55(f)(1) and be accounted for in the licensee's protective strategy. The licensee shall implement a process for the oversight of target set equipment and systems to ensure that changes to the configuration of the identified equipment and systems are considered in the licensee's protective strategy. Where appropriate, changes must be made to documented target sets."

Section 11.5 of the PSP describes that target set equipment or elements that are not contained within a protected or vital area are identified and accounted for in the site protective strategy

In connection with the review of the ESBWR physical protection program, the staff identified several RAIs relating to target sets. In light of these RAIs, GE Hitachi [GEH] provided additional design detail to give the applicant insight into the development of site-specific target set analyses. The applicant incorporates by reference the design of physical protection systems within the design of the vital island and vital structures for the ESBWR, as described in the ESBWR DCD including topical reports, NEDE-33389, NEDE-33390, and NEDE-33391.

GE Hitachi stated in NEDE-33391, "ESBWR Safeguards Assessment Report," that target sets were created to aid in the development of the ESBWR physical security systems, which are not considered as final or fully comprehensive because of the simplified assumptions that were made, and that a comprehensive target set document must be developed following an approved development process. GE Hitachi also stated that the insights from the development of target sets described in the ESBWR Safeguards Assessment Report should be considered and included, as appropriate. However, the simplifying assumptions need to be expanded to include the necessary combinations of Target Set elements. In addition, the Target Set document should include adjustments to reflect site-specific conditions.

The NRC staff has reviewed the applicant's description in Sections 11.5 and 14.5 of the PSP, Section 7 of the SCP, and information in NEDE-33391, "ESBWR Safeguards Assessment Report," for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in Sections 11.5 and 14.5 of the PSP, Section 7 of the SCP, and the information in NEDE-33391, "ESBWR Safeguards Assessment Report," conform to the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in Sections 11.5 and 14.5 of the PSP and Section 7 of the SCP meets the requirements of 10 CFR 73.55(f)(1), (3) and (4), and is, therefore, acceptable. The target sets, target set analysis and site protective strategy are in facility implementing procedures, which were not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii).

Delay Barriers

The provisions of 10 CFR 73.55(e)(3)(ii) require that physical barriers must "provide deterrence, delay, or support access control" to perform the required function of the applicant's physical protection program. The PSP describes the use of delay barriers at Fermi 3.

Section 11.6 of the PSP includes a description of the use of delay barriers to meet the requirements of 10 CFR 73.55(e).

The NRC staff has reviewed the applicant's description in PSP Sections 11, 11.1, 11.2, 11.2.1, 11.2.2, and 11.2.3, and Sections 11.3 through 11.6 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP conforms to the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(e), and therefore is acceptable.

13.6.4.1.12 Security Posts and Structures

The provisions of 10 CFR 73.55(e)(5) require that the reactor CR, the CAS, and the location within which the last access control function for access to the PA is performed, must be bullet-resisting.

Section 12 of the PSP states that security posts and structures are qualified to a level commensurate with their application within the site protective strategy, and that these positions are constructed of bullet resisting materials. Section 11.4 of the PSP states the reactor CR, the CAS, and the location within which the last access control function for access to the PA is performed must be bullet resisting.

The NRC staff has reviewed the applicant's description in PSP Section 12 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP conforms to the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(e)(5), and therefore is acceptable.

13.6.4.1.13 Access Control Devices

Regulations in 10 CFR 73.55(g)(1) state that, consistent with the function of each barrier or barrier system, the applicant shall control personnel, vehicle, and material access, as applicable, at each access control point in accordance with the physical protection program design requirements of 10 CFR 73.55(b).

The applicant addresses STD COL 13.6-6-A as follows: The provisions of 10 CFR 73.55(g)(6) require control of access control devices as stated: "The licensee shall control all keys, locks, combinations, passwords and related access control devices used to control access to PAs, vital areas and security systems to reduce the probability of compromise."

Types of Security Related Access Control Devices

Section 13.1 of the PSP describes that the applicant uses security-related access control devices to control access to protected and vital areas and security systems.

Control and Accountability

Subsection 13.2.1 of the PSP describes the control of security related locks. Subsection 13.2.2 of the PSP describes the controls associated with the changes to and replacements of access control devices and the accountability and inventory control process, and the circumstances that require changes in security related locks. The applicant uses facility procedures to produce, control, and recover keys, locks, and combinations for all areas and equipment which serve to reduce the probability of compromise. The issue of access control devices is limited to individuals who have unescorted access authorization and need access to perform official duties and responsibilities. Keys and locks are accounted for through a key inventory control process as described in facility procedures.

The NRC staff has reviewed the applicant's description in PSP Sections 13, 13.1, 13.2, 13.2.1, and 13.2.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the descriptions provided in the PSP meet the requirements of 10 CFR 73.55(g)(1) and (6), and therefore are acceptable.

13.6.4.1.14 Access Requirements

Access Authorization and Fitness for Duty

The provisions of 10 CFR 73.55(b)(7) require the applicant to establish, maintain, and implement an access authorization program in accordance with 10 CFR 73.56 and to describe the program in the PSP. The provisions of 10 CFR Part 26 require the applicant to establish and maintain an FFD program.

Section 14.1 of the PSP describes that the access authorization program implements regulatory requirements utilizing the provisions in RG 5.66, "Nuclear Power Plant Access Authorization Program," Revision 1, dated July 2009. RG 5.66 is an acceptable method for meeting the requirements of 10 CFR 73.55(b)(7).

The NRC staff has reviewed the applicant's description in PSP Section 14.1 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(b)(7), 10 CFR 73.56 and 10 CFR Part 26 and therefore is acceptable.

Insider Mitigation Program

The provisions of 10 CFR 73.55(b)(9) require that the applicant establish, maintain, and implement an insider mitigation program and describe the program in the PSP. The insider mitigation program must monitor the initial and continuing trustworthiness and reliability of individuals granted or retaining unescorted access authorization to a protected or vital area, and implement defense-in-depth methodologies to minimize the potential for an insider to adversely affect, either directly or indirectly, the applicant's capability to prevent significant core damage and spent fuel sabotage. The insider mitigation program must include elements from: the access authorization program; the FFD program; the cyber security program; and the physical protection program.

Section 14.2 of the PSP describes how the applicant will establish, maintain, and implement an insider mitigation program utilizing the guidance in RG 5.77. The insider mitigation program requires elements from the access authorization program described in 10 CFR 73.56; the FFD program described in 10 CFR Part 26; the cyber security program described in 10 CFR 73.54, and the physical security program described in 10 CFR 73.55. In addition, Section 14.2 describes the integration of the programs mentioned above to form a cohesive and effective insider mitigation program. The applicant addresses the observations for the detection of tampering. RG 5.77 is an acceptable method for meeting the requirements of 10 CFR 73.55(b)(9).

In RAI 13.06.01-46, the NRC staff asked the applicant to address the methodology and frequency chosen to monitor and/or patrol the spent fuel pool including proposed alternative measures. In its response dated May 17, 2010, the applicant stated that the spent fuel pool for Fermi 3 will be monitored and patrolled as stated in PSP Section 14.2.

Accordingly, the NRC staff finds the response to RAI 13.06.01-46 acceptable as it provides required detail on how the applicant meets 10 CFR 73.55(i)(5). Therefore, RAI 13.06.01.46 is closed.

The NRC staff has reviewed the applicant's description in PSP Section 14.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(b)(9), and therefore is acceptable.

Picture Badge Systems

Requirements for badges are stated in 10 CFR 73.55(g)(6)(ii). "The licensee shall implement a numbered photo identification badge system for all individuals authorized unescorted access to the PA and vital areas. In addition, identification badges may be removed from the protected

area under limited conditions and only by authorized personnel. Records of all badges shall be retained and shall include name and areas to which persons are granted unescorted access."

The provisions of 10 CFR 73.55(g)(7)(ii) require that individuals not employed by the applicant, but who require frequent or extended unescorted access to the PA and/or vital areas to perform duties and responsibilities required by the applicant at irregular or intermittent intervals, shall satisfy the access authorization requirements of 10 CFR 73.56 and 10 CFR Part 26 of this chapter, and shall be issued a non-employee photo identification badge that is easily distinguished from other identification badges before being allowed unescorted access to the protected and vital areas. Non-employee photo identification badges must visually reflect that the individual is a non-employee and that no escort is required.

Section 14.3 of the PSP describes the site picture badge system, as follows: Identification badges will be displayed while individuals are inside the PA or vital areas. When not in use, badges may be removed from the PA by authorized holders, provided that a process exists to deactivate the badge upon exit and positively confirm the individual's true identity and authorization for unescorted access prior to entry into the PA. Records are maintained to include the name and areas to which unescorted access is granted of all individuals to whom photo identification badges have been issued.

The NRC staff has reviewed the applicant's description in PSP Section 14.3 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(g)(6)(ii) and (7)(ii), and therefore is acceptable.

Searches

The provisions of 10 CFR 73.55(h) require, in part, that the applicant meet the objective to detect, deter, and prevent the introduction of firearms, explosives, incendiary devices, or other items that could be used to commit radiological sabotage. To accomplish this, the applicant shall search individuals, vehicles, and materials consistent with the physical protection program design requirements in paragraph (b) of this section, and the function to be performed at each access control point or portal before granting access.

Section 14.4 of the PSP provides an overview description of the search process for vehicle, personnel and materials. The search process is conducted using security personnel, specifically trained non-security personnel, and technology. Detailed discussions of actions to be taken in the event unauthorized materials are discovered are found in implementing procedures.

Vehicle Barrier Access Control Point

The provisions of 10 CFR 73.55(h)(2)(ii) through (v) provide the requirements for the applicant to search vehicles at the OCA and 10 CFR 73.55(h)(3) provides requirements for searches of personnel, vehicles and materials prior to entering the PA.

Subsection 14.4.1 of the PSP describes the process for the search of personnel, vehicles and materials at predetermined locations prior to granting access to designated facility areas

identified by the applicant as needed to satisfy the physical protection program. The applicant states that it has developed specific implementing procedures to address vehicle and materials searches at these locations.

Protected Area Packages and Materials Search

Subsection 14.4.2 of the PSP describes the process for conducting searches of packages and materials for firearms, explosives, incendiary devices, or other items that could be used to commit radiological sabotage using equipment capable of detecting these items or through visual and physical searches or both to ensure that all items are clearly identified before these items can enter the Fermi PA. Detailed provisions for conducting these searches are found in the applicant's implementing procedures and include the search and control of bulk materials and products. The applicant's implementing procedures also discuss the control of packages and materials previously searched and tamper sealed by personnel trained in accordance with the T&QP.

Protected Area Vehicle Search

Subsection 14.4.3 of the PSP describes the process for the search of vehicles for firearms, explosives, incendiary devices, or other items that could be used to commit radiological sabotage using equipment capable of detecting these items or through visual and physical searches or both to ensure that all items are clearly identified at the PA. Detailed provisions for conducting these searches are found in the applicant's implementing procedures. The applicant's implementing procedures also address the search methodologies for vehicles that must enter the PA under emergency conditions.

Protected Area Personnel Searches

Subsection 14.4.4 of the PSP describes the process for searches of all personnel requesting access into PAs. The PSP describes the search for firearms, explosives, incendiary devices, or other items that could be used to commit radiological sabotage using equipment capable of detecting these items or through visual and physical searches or both to ensure that all items are clearly identified prior to granting access into the PA. All persons except official Federal, State, and Local Law Enforcement Agency personnel on official duty are subject to these searches upon entry to the PA. Detailed discussions of observation and control measures are found in the implementing procedures.

Protected Area Access Controls

Subsection 14.4.5 of the PSP describes the process for controlling access at all points where personnel or vehicles could gain access into the applicant's PA. The plan notes that all points of personnel access are through a lockable portal. The entry process is normally monitored by multiple security personnel. Personnel are normally allowed access through means that verify identity and authorization following the search process. Vehicles are controlled through positive control methods described in facility procedures.

Escort and Visitor Requirements

The provisions of 10 CFR 73.55(g)(7) state, in part, that the applicant may permit escorted access to protected and vital areas to individuals who have not been granted unescorted access in accordance with the requirements of 10 CFR 73.56 and 10 CFR Part 26. Provisions in 10 CFR 73.55(g)(8) establish escort requirements. The applicant is required to implement procedures for processing, escorting and controlling visitors. Procedures will address confirmation of identity of visitors, maintenance of a visitor control register, visitor badging and escort controls including, training, communications, and escort ratios.

Subsection 14.4.6 of the PSP describes the process for control of visitors. The PSP affirms that procedures address the identification, processing, and escorting of visitors, and the maintenance of a visitor control register. Training provisions for escorting visitors include responsibilities, communications and escort ratios. All escorts are trained to perform escort duties in accordance with site requirements as described in the procedures. All visitors wear a badge that clearly indicates that an escort is required.

The NRC staff has reviewed the applicant's description in PSP Sections 14.4, and 14.4.1 through 14.4.6 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Section 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(h)(2), (h)(3), (g)(7) and (g)(8), and therefore is acceptable.

Vital Area Access Controls

The provisions of 10 CFR 73.55(g)(4) require that the applicant control access into vital areas consistent with established access authorization lists. In response to a site-specific credible threat or other credible information, the applicant shall implement a two-person (line-of-sight) rule for all personnel in vital areas so that no one individual is permitted access to a vital area.

The provisions of 10 CFR 73.56(j) require the applicant to establish, implement, and maintain a list of individuals who are authorized to have unescorted access to specific nuclear power plant vital areas during non-emergency conditions. The list must include only those individuals who have a continued need for access to those specific vital areas in order to perform their duties and responsibilities. The list must be approved by a cognizant manager or supervisor who is responsible for directing the work activities of the individual who is granted unescorted access to each vital area, and be updated and reapproved no less frequently than every 31 days.

Section 14.5 of the PSP describes vital areas and that the applicant maintains vitals areas locked and protected by an active intrusion alarm system. An access authorization system is established to limit unescorted access that is controlled by an access authorization list that is reassessed and reapproved at least once every 31 days. Additional access control measures are described in the facility procedures.

The NRC staff has reviewed the applicant's description in PSP Section 14.5 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff

finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(g)(4), and therefore is acceptable.

13.6.4.1.15 Surveillance Observation and Monitoring

The provisions of 10 CFR 73.55(i)(1) require that the applicant establish and maintain intrusion detection systems that satisfy the design requirements of 10 CFR 73.55(b) and provide, at all times, the capability to detect and assess unauthorized persons and facilitate the effective implementation of the protective strategy.

Illumination

The provisions of 10 CFR 73.55(i)(6) require, in part, that all areas of the facility are provided with illumination necessary to satisfy the design requirements of 10 CFR 73.55(b) and implement the protective strategy. Specific requirements include providing a minimum illumination level of 0.2 foot-candles, measured horizontally at ground level, in the isolation zones and appropriate exterior areas within the PA. Alternatively, the applicant may augment the facility illumination system by means of low-light technology to meet the requirements of this section or otherwise implement the protective strategy. The applicant shall describe in the security plans how the lighting requirements of this section are met and, if used, the type(s) and application of low-light technology.

Section 15.1 of the PSP describes that all isolation zones and appropriate exterior areas within the PA have lighting capabilities that provide illumination sufficient for the initiation of an adequate response to an attempted intrusion of the isolation zone, a PA, or a vital area. A discussion of the implementation of technology using fixed and non-fixed low light level cameras or alternative technological means is provided. The applicant has addressed the potential for loss of lighting and the compensatory actions that would be taken if that event were to occur.

Surveillance Systems

The provisions of 10 CFR 73.55(i)(5) require, in part, that the applicant implement, establish, and maintain intrusion detection and assessment, surveillance, and observation and monitoring systems to satisfy the design requirements of 10 CFR 73.55(b), and to conform to the applicant's OCA.

Section 15.2 of the PSP describes that surveillance is accomplished by human observation and technology. Surveillance systems include a variety of cameras, video display, and annunciation systems designed to assist the security organization in observing, detecting, and assessing alarms or unauthorized activities. Certain systems provide real-time and recorded play back of recorded video images. The specifics of surveillance systems are described in facility implementing procedures.

Intrusion Detection Equipment

Section 15.3 of the PSP describes the perimeter intrusion detection system, and the PA and vital area intrusion detection systems. These systems are capable of detecting attempted penetration of the PA perimeter barrier; are monitored with assessment equipment designed to satisfy the requirements of 10 CFR 73.55(i) and provide real-time and play-back/recorded video images of the detected activities before and after each alarm annunciation. The PSP describes

how the applicant will meet regulatory requirements for redundancy, tamper indication and uninterruptable power supply.

Central Alarm Station (CAS) and Secondary Alarm Station (SAS) Operation

The applicant addresses STD COL 13.6-7-A and EF3 COL 13.6-8-A as follows: The provisions of 10 CFR 73.55(i)(4) provide requirements for alarm stations. It is required, in 10 CFR 73.55(i)(4)(i) that both alarm stations must be designed and equipped to ensure that a single act, in accordance with the DBT of radiological sabotage defined in 10 CFR 73.1, cannot disable both alarm stations. The applicant shall ensure the survivability of at least one alarm station to maintain the ability to perform the following functions: 1) detect and assess alarms; 2) initiate and coordinate an adequate response to an alarm; 3) summon offsite assistance; and 4) provide command and control. The provisions of 10 CFR 73.55(i)(4)(iii) require, in part, that the CAS and SAS alarm stations must be equal and redundant.

Section 15.4 of the PSP describes the functional operations of the CAS and the SAS. The PSP provides that the alarm stations are equipped such that no single act will disable both alarm stations. The applicant's PSP provides that each alarm station is properly manned and that no activities are permitted that would interfere with the operator's ability to execute assigned duties and responsibilities.

In RAI 13.06.01-21, the NRC staff asked the applicant how COL action item 13.6-8-A will be addressed. In its response dated August 30, 2010 (ADAMS Accession No. ML102440652), the applicant provided an "Analysis of the No Single Act Requirement for CAS and SAS." This analysis has been included as Appendix 8C of Part 8.

The NRC staff finds the response to RAI 13.06.01-21, in regard to EF3 COL 13.6-8-A, acceptable because the analysis shows that the CAS and SAS are designed and equipped to ensure that a single act cannot disable both stations. Therefore, this portion of RAI 13.06.01-21 is closed.

Security Patrols

Owner Controlled Area Surveillance and Response

The provisions of 10 CFR 73.55(e)(6) require that the applicant establish and maintain physical barriers in the OCA, as needed, to satisfy the physical protection program design requirements of 10 CFR 73.55(b). It is required in 10 CFR 73.55(i)(5)(ii), in part, that the applicant provide continuous surveillance, observation and monitoring of the OCA and that these responsibilities may be performed by security personnel during continuous patrols, through the use of video technology, or by a combination of both.

Subsection 15.5.1 of the PSP describes the processes used to meet this requirement. The PSP discusses the process to be used and provides that details regarding the implementation of OCA surveillance techniques are found in facility procedures. The PSP provides a discussion regarding the implementation of manned and video options for patrolling and surveillance of the OCA.

Protected and Vital Area Patrols

The provisions of 10 CFR 73.55(i)(5)(iii) through (viii) require, in part, that armed patrols check unattended openings that intersect a security boundary, such as an underground pathways, check external areas of the PA and vital area portals, periodically inspect vital areas, conduct random patrols of accessible target set equipment, be trained to recognize obvious tampering and if detected, initiate an appropriate response in accordance with established plans and procedures.

Subsection 15.5.2 of the PSP describes the process employed by the applicant to meet the above requirements. The PSP describes the areas of the facility that will be patrolled and observed, as well as the frequency of these patrols and observations. The applicant has provided for observations to detect tampering in Section 14.2 of the PSP and in the facility procedures.

The NRC staff has reviewed the applicant's description in PSP Sections 15, 15.1 through 15.4, 15.5.1, and 15.5.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. The staff has verified that the PSP provides for the identification of openings, areas, and equipment that must be checked, inspected, or otherwise observed by armed patrols. Further, the staff has determined that the PSP provides for training of patrols and procedures to recognize obvious tampering and to initiate an appropriate response to recognized tampering. In view of these staff determinations the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(b) and (i), and therefore are acceptable with respect to surveillance, observation, and monitoring.

13.6.4.1.16 Communications

The provisions of 10 CFR 73.55(j)(1) through (6) describe the requirements for establishment and maintenance of continuous communication capabilities with both onsite and offsite resources to ensure effective command and control during both normal and emergency situations. An individual assigned to an alarm station must be capable of calling for assistance, on-duty security force personnel must be capable of maintaining continuous communication with each alarm station and vehicle escorts, and personnel escorts must maintain timely communication with security personnel. Continuous communication capabilities must terminate in both alarm stations, including that between LLEA and each alarm station and the between the CR and each alarm station. Non-portable communications must remain operable from independent power sources. The applicant must identify areas where communications could be interrupted or not maintained.

Notifications (Security Contingency Event Notifications)

Section 16.1 of the PSP states that the applicant has a process to ensure that continuous communications are established and maintained between the onsite security force staff and the offsite support agencies.

System Descriptions

Section 16.2 of the PSP describes the establishment and maintenance of the communications system. Detailed descriptions of security systems are included in the facility procedures, including areas where communications could be interrupted or not maintained. The Fermi site security personnel have access to both hard wired and alternate communications systems. Site security personnel are assigned communications devices to maintain continuous communications with the CAS and SAS. All personnel and vehicles are assigned communications resources with which to maintain continuous communications. Continuous communication protocols are available between the CAS, SAS and the CR. The applicant maintains a secondary power source, within a vital area, for all non-portable security communications equipment.

The NRC staff has reviewed the applicant's description in PSP Sections 16, 16.1 and 16.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(j)(1) through (6), and therefore are acceptable.

13.6.4.1.17 Review, Evaluation, and Audit of the Physical Security Program

The provisions of 10 CFR 73.55(m) require, in part that each element of the physical protection program be reviewed at least every 24 months. A review is required within 12 months after initial physical protection program implementation or a change in personnel, procedures, equipment or facilities that could have a potentially adverse effect on security. A review is also required as necessary based on site-specific analysis assessments, or other performance indicators. Reviews must be conducted by individuals independent of those responsible for security program and those directly responsible for implementation of the onsite physical protection program. Reviews must include an audit of security plans, implementing procedures and local law enforcement commitments. Results of reviews shall be presented to management at least one level above the level responsible for day-to-day plant operations, and findings must be entered in the site corrective action program.

Section 17 of the PSP describes that the physical security program is reviewed 12 months following initial implementation and at least every 24 months by individuals independent of both security program management and personnel who have a direct responsibility for implementation of the security program. The physical security program review includes, but is not limited to, an audit of the effectiveness of the physical security program, cyber security plans, implementing procedures, safety/security interface activities, the testing, maintenance, and calibration program, and response commitments by local, State, and Federal law enforcement authorities.

The PSP also states that a review shall be conducted as necessary based upon site-specific analyses, assessments, or other performance indicators and as soon as reasonably practical, but no longer than 12 months, after changes occur in personnel, procedures, equipment, or facilities that potentially could adversely affect safety/security.

The PSP provides further that the results and recommendations of the physical security program review, management's finding on whether the physical security program is currently

effective and any actions taken as a result of recommendations from prior program reviews are documented in a report to plant management and to appropriate corporate management at least one level higher than that having responsibility for the day-to-day plant operation. The PSP provides that these reports are maintained in an auditable form and maintained for inspection.

The PSP states that findings from the onsite physical security program reviews are entered into the facility corrective action program.

The provisions of the PSP described above are virtually identical to the requirements of Section 73.55(m) summarized above, and the PSP satisfies those requirements. The NRC staff, however, raised a question regarding how the application addressed the requirements of 10 CFR 73.58.

In RAI 13.06.01-47, the NRC staff requested that the applicant address the requirements of 10 CFR 73.58, "Safety/security requirements for nuclear power reactors." In its response, the applicant stated that procedures similar to the administrative procedures implemented for Fermi 2 will be developed and implemented to manage the safety/security interface for Fermi 3 in accordance with 10 CFR 73.58. Additionally, a description of the Fermi 3 safety/security interface program will be included in Fermi COL FSAR, Subsection 13.6.2.

The NRC staff finds that the response to RAI 13.06.01-47 meets the requirements of 10 CFR 73.58 and is acceptable, because it provides a commitment to implement administrative procedures to manage the safety/security interface. Specifically the Fermi COL FSAR Revision 3, Subsection 13.6.2, dated February 2011, states:

> STD SUP 13.6-2 [START COM 13.6-002] Administrative procedures have been implemented that meet the requirements of 10 CFR 73.58 for managing the safety/security interface [END COM 13.6-002].

The staff has verified that COM 13.6-002 has been included in the Fermi 3 FSAR. Therefore, this RAI 13.06.01-47 is closed. In RAI 13.06.01-57, the NRC staff requested clarification pertaining to how the applicant, once licensed, will analyze and identify changes in the site-specific conditions related to the ESBWR's structures, systems, and components (SSCs) (described in certain technical reports), resulting from changes made to the Fermi 3 COL between issuance of the COL and the security program implementation milestones provided in FSAR Table 13.4-201 to ensure that the security plan continues to meet 10 CFR 73.55(b)(4). Also, clarify how the applicant, once licensed, will ensure that the as-built plant continues to meet all physical protection program design and performance criteria in 10 CFR 73.55 at the time the physical protection program is implemented.

During a public telephone call on August 4, 2014 (ML14281A128), the NRC staff provided feedback to the applicant concerning the addition of "NRC endorsed" and the removal of "currently accepted" to the RAI 13.06.01-57 response. In a letter dated August 4, 2014, the applicant submitted to the NRC a revised COLA markup associated with its response to RAI 13.06.01-57.

In its response, the applicant stated that the description of the content of the administrative procedures implementing the 10 CFR 73.58 Fermi 3 COLA FSAR, Subsection 13.6.2 will be revised as follows:

These procedures are in effect at the time of issuance of the COL and were developed using NRC endorsed industry guidance.

The NRC staff finds that the response to RAI 13.06.01-57 meets the requirements of 10 CFR 73.55(b)(4) and 10 CFR 73.58 and is acceptable, because it provides a commitment to implement administrative procedures to manage the safety/security interface during the construction phase and throughout the operational phase. The incorporation of changes to the Fermi 3 COL FSAR, Section 13.6.2 is being tracked as Confirmatory Item 13.6-1. The staff verified that FSAR Revision 7 incorporated changes provided in response to RAI 13.06.01-57. Therefore, Confirmatory Item 13.6-1 is resolved.

The NRC staff has reviewed the applicant's description in PSP Section 17 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. As set forth above, the staff finds that the applicant's description in the PSP meets the requirements of 10 CFR 73.55(b)(4), and 10 CFR 73.55(m), and therefore is acceptable.

13.6.4.1.18 Response Requirements

The provisions of 10 CFR 73.55(k) require, in part, that the applicant establish and maintain a properly trained, qualified and equipped security force required to interdict and neutralize threats up to and including the DBT defined in 10 CFR 73.1, to prevent significant core damage and spent fuel sabotage. To meet this objective, the applicant must ensure that necessary equipment is in supply, working, and readily available. The applicant must ensure training has been provided to all armed members of the security organization who will be available on site to implement the applicant's protective strategy as described in the facility procedures and 10 CFR Part 73, Appendix C. The applicant must have facility procedures to reconstitute armed response personnel and have established working agreement(s) with LLEA. The applicant must have implemented a threat warning system to accommodate heightened security threats and coordination with NRC representatives.

Section 18 of the PSP describes an armed response team, as well as its responsibilities, training and equipment, and the number of armed response force personnel required to be immediately available at all times to implement the site's protective strategy. The PSP provides for training in accordance with the requirements of 10 CFR Part 73, Appendix B that will ensure implementation of the site protective strategy in accordance with 10 CFR Part 73, Appendix C. Procedures are in place to reconstitute the armed response personnel as are agreements with LLEA. The PSP also describes procedures to manage the threat warning system.

The NRC staff has reviewed the applicant's description in PSP Section 18 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(k), and therefore is acceptable.

13.6.4.1.19 Special Situations Affecting Security

The provisions of 10 CFR 73.58 require that each nuclear power reactor applicant requesting a license be issued under 10 CFR Part 50 or

10 CFR Part 52, comply with the following requirements: the applicant shall assess and manage the potential for adverse effects on safety and security, including the site emergency plan, before implementing changes to plant configurations, facility conditions, or security; the scope of changes to be assessed and managed must include planned and emergent activities (such as, but not limited to, physical modifications, procedural changes, changes to operator actions or security assignments, maintenance activities, system reconfiguration, access modification or restrictions, and changes to the security plan and its implementation); where potential conflicts are identified, the applicant shall communicate them to appropriate personnel and take compensatory and/or mitigative actions to maintain safety and security under applicable Commission regulations, requirements, and license conditions.

The provisions of 10 CFR 73.55(a)(2) require the applicant's security plans to identify, describe, and account for site-specific conditions that affect its capability to satisfy the requirements of that section.

The provisions of 10 CFR 73.55(n)(8) require, in part, operational and post-maintenance performance testing to ensure operational readiness for security equipment and systems.

Refueling/Major Maintenance

Section 19.1 of the PSP describes that security procedures identify measures for implementation of actions prior to refueling or major maintenance activities. These measures include controls to ensure that a search is conducted prior to revitalizing an area, that protective barriers and alarms are fully operational, and that post-maintenance performance testing is performed to ensure operational readiness of equipment in accordance with 10 CFR 73.55(n)(8).

Construction and Maintenance

Section 19.2 of the PSP states that during periods of construction and maintenance when temporary modifications are necessary, the applicant will implement measures that provide for equivalency in the physical protective measures and features impacted by the activities such that physical protection measures are not degraded. The process for making such changes or modifications is included in the facility procedures.

The NRC staff has reviewed the applicant's description in PSP Sections 19.1 and 19.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(n)(8) and 10 CFR 73.58, and are, therefore, acceptable.

13.6.4.1.20 Maintenance, Testing, and Calibration

In accordance with 10 CFR 73.55(n), the applicant is required to establish, maintain, and implement a maintenance, testing, and calibration program to ensure that security systems and equipment, including secondary and uninterruptible power supplies, are tested for operability and performance at predetermined intervals, maintained in operable condition, and have the

capability of performing their intended functions. The regulation requires that the applicant describe its maintenance testing and calibrations program in the PSP, and that the implementing procedures describe the details and intervals for conducting these activities. Applicant procedures must identify criteria for documenting deficiencies in the corrective action program and ensuring data protection in accordance with 10 CFR 73.21. The applicant must conduct periodic operability testing of the intrusion alarm system and must conduct performance testing at the beginning and end of the period for which it is used for security, or if the period of continuous use exceeds 7 days, at least once every seven days. Communication equipment must be tested not less than daily, and search equipment must also be tested periodically. Procedures must be established for testing equipment located in hazardous areas, and procedures must be established for returning equipment to service after each repair.

Sections 20.1 through 20.6 of the PSP describe the maintenance, testing and calibration program for security-related equipment. Section 20.1 states that the applicant shall conduct intrusion detection testing in accordance with recommended testing procedures described in RG 5.44, Revision 3 which specifies testing frequency. Accordingly, the staff has determined that the PSP provides for testing of each operational component credited for the implementation of the security program at a frequency in accordance with 10 CFR 73.55(n), the PSP, and implementing procedures.

The NRC staff has reviewed the applicant's description in PSP Sections 20 and 20.1 through20.6 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(n), and therefore are acceptable.

13.6.4.1.21 Compensatory Measures

The provisions of 10 CFR 73.55(o) require, in part, that the applicant shall identify criteria and measures to compensate for degraded or inoperable equipment, systems, and components to meet the requirements of section 73.55. Compensatory measures must provide a level of protection that is equivalent to the protection that was provided by the degraded or inoperable, equipment, system, or components. Compensatory measures must be implemented within specific time frames necessary to meet the appropriate portions of 10 CFR 73.55(b) and described in the security plans.

Section 21 of the PSP identifies measures and criteria to compensate for degraded or inoperable equipment, systems, and components in accordance with 10 CFR 73.55(o) to assure that the effectiveness of the physical protection system is not reduced by failure or other contingencies affecting the operation of the security-related equipment or structures. Sections 21.1 through 21.12 of the PSP address PA and vital area barriers, intrusion detection and alarm systems, lighting, fixed and non-fixed closed circuit television, play-back and recorded video systems, computer systems, access control devices, VBSs, channeling barrier systems, and other security related equipment.

The NRC staff has reviewed the applicant's description in PSP Sections 21 and 21.1 through 21.12, for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800,

Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(o), and therefore is acceptable.

13.6.4.1.22 Records

The provisions of 10 CFR 73.55(q) and 10 CFR Part 73, Appendix B, Section VI.H, and Appendix C, Section II.C , require, in part, that the applicant must retain and maintain all records required to be kept by the Commission regulations, orders, or license conditions until the Commission terminates the license for which the records were developed, and shall maintain superseded portions of these records for at least three years after the record is superseded, unless otherwise specified by the Commission. The provisions of 10 CFR Part 26, Subpart N, 10 CFR 73.56(o), and 10 CFR 73.70 include requirements for records regarding fitness for duty, access authorization, and certain other security-related matters, respectively. Among other things, the applicant is required to keep records of contracts with any contracted security force that implements any portion of the onsite physical protection program for the duration of the contract. The applicant must make all records, required to be kept by the Commission, available to the Commission and the Commission may inspect, copy, retain and remove all such records, reports and documents whether kept by the applicant or a contractor. Review and audit reports must be maintained and available for inspection for a period of 3 years.

Section 22 of the PSP addresses the requirements to maintain records. Sections 22.1 through 22.13 address each kind of record that the applicant will maintain and the duration of retention for each record. The following types of records are maintained in accordance with the above mentioned regulations: access authorization; suitability, physical, and psychological qualification records for security personnel; PA and vital area access control records; PA visitor access records; PA vehicle access records; vital area access transaction records; vitalization and de-vitalization records; vital area access list reviews; security plans and procedures; security patrols, inspections and tests; maintenance; CAS and SAS alarm annunciation and security response records; LLEA records; records of audits and reviews; access control devices; security training and qualification records; firearms testing and maintenance records; and engineering analysis for the VBS.

The NRC staff has reviewed the applicant's description in PSP Sections 22 and 22.1 through 22.13 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1 the staff finds that the descriptions provided in the PSP meet the requirements of 10 CFR Part 26, 10 CFR 73.55(q), 10 CFR 73.56(o), and 10 CFR 73.70, and are, therefore, acceptable.

13.6.4.1.23 Digital Systems Security

Section 23 of the PSP addresses digital systems security. The applicant stated in its PSP that it has implemented the requirements of 10 CFR 73.54 and maintains a cyber security plan that describes how it has provided high assurance that safety, security, and emergency preparedness (SSEP) functions are protected against the DBT.

The NRC staff's review of the cyber security plan is found in Section 13.8 of this SER.

13.6.4.1.24 Temporary Suspension of Security Measures

The provisions of 10 CFR 73.55(p) allow the applicant to suspend implementation of affected requirements of this section under the following conditions: (i) In accordance with 10 CFR 50.54(x) and 50.54(y) of this chapter, the licensee may suspend any security measures under this section in an emergency when this action is immediately needed to protect the public health and safety and no action consistent with license conditions and technical specifications that can provide adequate or equivalent protection is immediately apparent. This suspension of security measures must be approved as a minimum by a licensed senior operator before taking this action. (ii) During severe weather when the suspension of affected security measures is immediately needed to protect the personal health and safety of security force personnel and no other immediately apparent action consistent with the license conditions and technical specifications can provide adequate or equivalent protection. This suspension of security measures must be approved, as a minimum, by a licensed senior operator, with input from the security supervisor or manager, before taking this action.

Suspension of Security Measures in Accordance with 10 CFR 50.54(x) and (y)

Section 24.1 of the PSP addresses suspension of security measures in accordance with 10 CFR 50.54(x) and 10 CFR 50.54(y). Specifically, the plan provides description of the conditions under which suspension is permissible, the level of authority necessary to suspend security measures, and the provisions for reporting such a suspension.

Suspension of Security Measures during Severe Weather or Other Hazardous Conditions

As required in 10 CFR 73.55(p), state in part, suspension of security measures are reported and documented in accordance with the provisions of 10 CFR 73.71. Section 73.55(p) states further that this suspension of security measures must be approved, as a minimum, by a licensed senior operator, with input from the security supervisor or manager, before taking this action. Suspended security measures must be reinstated as soon as conditions permit.

Section 24.2 of the PSP provides that certain security measures may be temporarily suspended during circumstances such as imminent, severe or hazardous weather conditions, but only when such action is immediately needed to protect the personal health and safety of security force personnel and no other immediately apparent action consistent with the security measures can provide adequate or equivalent protection. Under the PSP, suspended security measures shall be restored as soon as practical.

The NRC staff has reviewed the applicant's description in PSP Sections 24, 24.1, and 24.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the PSP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the PSP meets the requirements of 10 CFR 73.55(p), and therefore is acceptable.

13.6.4.1.25 Appendix A Glossary of Terms and Acronyms

Appendix A, "Glossary of Terms and Acronyms," was reviewed and found to be consistent with the NRC endorsed NEI 03-12, Revision 6 template.

13.6.4.1.26 Conclusions on the Physical Security Plan

Accordingly, the NRC staff's review described in Subsections 13.6.4.1.1 through 13.6.4.1.25 of this SER, the Fermi 3 PSP meets the requirements of 10 CFR 73.55(a) through (r). The target sets, target set analysis, and site protective strategy are in the facility implementing procedures, which were not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and procedurally correct implementation of the PSP will provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety.

13.6.4.2 *Appendix B Training and Qualification Plan*

13.6.4.2.1 Introduction

The provisions of 10 CFR 73.55(c)(4) state that the applicant shall establish, maintain, implement, and follow a T&QP that describes how the criteria set forth in 10 CFR Part 73, Appendix B will be implemented.

The provisions of 10 CFR 73.55(d)(3) state that the applicant may not permit any individual to implement any part of the physical protection program unless the individual has been trained, equipped, and qualified to perform their assigned duties and responsibilities in accordance with 10 CFR Part 73, Appendix B and the T&QP. Non-security personnel may be assigned duties and responsibilities required to implement the physical protection program and shall:

(i) Be trained through established applicant training programs to ensure each individual is trained, qualified, and periodically requalified to perform assigned duties.

(ii) Be properly equipped to perform assigned duties.

(iii) Possess the knowledge, skills, and abilities, to include physical attributes such as sight and hearing, required to perform their assigned duties and responsibilities.

In addition, 10 CFR Part 73, Appendix B, Section VI.D.2(a) states armed and unarmed individuals shall be re-qualified at least annually in accordance with regulatory requirements and the Commission-approved T&QP.

The T&QP describes that it is written to address the requirements found in 10 CFR Part 73, Appendix B, Section VI. The applicant indicates that the objective of the plan is to provide a mechanism to ensure that members of the security organization, and all others who have duties and responsibilities in implementing the security requirements and protective strategy, are properly trained, equipped and qualified. The T&QP describes how deficiencies identified during the administration of the T&QP requirements are documented in the site corrective action program.

The NRC staff has reviewed the introduction section in the T&QP and has determined that it includes all of the programmatic elements necessary to satisfy the requirements of

10 CFR 73.55 and 10 CFR Part 73, Appendix B, Section VI applicable to the T&QP. Additional section-by-section evaluations and discussions are found in the following paragraphs.

13.6.4.2.2 Employment Suitability and Qualification

Provisions for mental qualifications, documentation, and physical requalification for security personnel (applicant employee and contractor) are described in the following T&QP sections.

Suitability

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.1(a) require, in part, that before employment, or assignment to the security organization, an individual shall: (1) possess a high school diploma or pass an equivalent performance examination designed to measure basic mathematical, language, and reasoning skills, abilities, and knowledge required to perform security duties and responsibilities; (2) have attained the age of 21 for an armed capacity or the age of 18 for an unarmed capacity; (3) not have any felony convictions that reflect on the individual's reliability; and (4) not be disqualified from possessing or using firearms or ammunition in accordance with applicable State or Federal law, including 18 U.S.C. 922, for individuals in an armed capacity. Applicants shall use information that has been obtained during the completion of the individual's background investigation for unescorted access to determine suitability. Satisfactory completion of a firearms background check for the individual under 10 CFR 73.19 of this part will also fulfill this requirement. The provisions of 10 CFR Part 73, Appendix B, Section VI.B.1(b) require that the qualification of each individual to perform assigned duties and responsibilities must be documented by a qualified training instructor and attested to by a security supervisor.

Section 2.1 of the T&QP details the requirements of qualifications for employment in the security organization that follows the regulation in 10 CFR Part 73, Appendix B, Section VI.B.1(a).

Physical Qualifications

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.2 require, in part, that individuals whose duties and responsibilities are directly associated with the effective implementation of the Commission-approved security plans, applicant protective strategy, and implementing procedures, may not have any physical conditions that would adversely affect their performance of assigned security duties and responsibilities.

Section 2.2 of the T&QP details that those individuals who are directly associated with implementation of the security plans, protective strategy and procedures, may not have any physical conditions that would adversely affect their performance of assigned security duties and responsibilities. All individuals that are found on the critical task matrix shall demonstrate the necessary physical qualifications prior to duty.

Physical Examination

It is stated in 10 CFR Part 73, Appendix B, Section VI.B.2(a)(2), that armed and unarmed individuals assigned security duties and responsibilities shall be subject to a physical examination designed to measure the individual's physical ability to perform assigned duties and responsibilities as identified in the Commission-approved security plans, applicant protective strategy, and implementing procedures.

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.2(a)(3) state, in part, that the physical examination must be administered by a licensed health professional with the final determination being made by a licensed physician to verify the individual's physical capability to perform assigned duties and responsibilities.

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.2.(b) through (e) provide the minimum requirements that individuals must meet, and include requirements for vision, hearing, review of existing medical conditions, and examination for potential addictions.

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.2(f) address medical examinations before returning to assigned duties following any incapacitation.

Section 2.3 of the T&QP describes the physical examinations for armed and unarmed individuals assigned security duties, as well as other individuals that implement parts of the physical protection program. Minimum requirements exist for physical examinations of vision, hearing, existing medical conditions, addiction or other physical requirements.

The NRC staff has reviewed the applicant's description in T&QP Sections 2.1, 2.2, and 2.3 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73 Appendix B, Sections VI.B.1 and VI.B.2, and are, therefore, acceptable.

Medical Examinations and Physical Fitness Qualifications

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.4(a), require, in part, that armed members of the security organization shall be subject to a medical examination by a licensed physician, to determine the individual's fitness to participate in physical fitness tests, and that the applicant shall obtain and retain a written certification from the licensed physician that no medical conditions were disclosed by the medical examination that would preclude the individual's ability to participate in the physical fitness tests or meet the physical fitness attributes or objectives associated with assigned duties.

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.4(b), require, in part, that before assignment, armed members of the security organization shall demonstrate physical fitness for assigned duties and responsibilities by performing a practical physical fitness test. The physical fitness test must consider physical conditions such as strenuous activity, physical exertion, levels of stress, and exposure to the elements as they pertain to each individual's assigned security duties. The physical fitness qualification of each armed member of the security organization must be documented by a qualified training instructor and attested to by a security supervisor.

Section 2.4 of the T&QP is explicit in its requirements for medical examinations and physical qualifications.

The NRC staff has reviewed the applicant's description in T&QP Section 2.4 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the

T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.B.4(a) and 10 CFR Part 73, Appendix B, Section VI.B.4(b), and therefore is acceptable.

Psychological Qualifications

General Psychological Qualifications

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.3(a),require, in part, that armed and unarmed individuals shall demonstrate the ability to apply good judgment, mental alertness, the capability to implement instructions and assigned tasks, and possess the acuity of senses and ability of expression sufficient to permit accurate communication by written, spoken, audible, visible, or other signals required by assigned duties and responsibilities.

Subsection 2.5.1 of the T&QP details that individuals whose security tasks and jobs are directly associated with the effective implementation of the security plan and protective strategy shall demonstrate the qualities in 10 CFR Part 73, Appendix B, Section VI.B.3(a).

Professional Psychological Examination

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.3(b), require, in part, that a licensed psychologist, psychiatrist, or physician trained in part to identify emotional instability shall determine whether armed members of the security organization and alarm station operators in addition to meeting the requirement stated in Appendix B, Section VI.B.3(a) , have no emotional instability that would interfere with the effective performance of assigned duties and responsibilities.

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.3(c), require that a person professionally trained to identify emotional instability shall determine whether unarmed individuals, in addition to meeting the requirement stated in Appendix B, Section VI.B.3(a), have no emotional instability that would interfere with the effective performance of assigned duties and responsibilities.

Subsection 2.5.2 of the T&QP provides for the administration of psychological and emotional determination that will be conducted by appropriately licensed and trained individuals.

The NRC staff has reviewed the applicant's description in T&QP Subsections 2.5.1 and 2.5.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Sections VI.B.3(a), (b) and (c), and therefore are acceptable.

Documentation

The provisions of 10 CFR Part 73, Appendix B, Section VI.H.1 require, in part, the retention of all reports, records, or other documentation required by Appendix B in accordance with 10 CFR 75.55(q).

Section 2.6 of the T&QP describes that qualified training instructors create the documentation of training activities and that security supervisors attest to these records, as required. Records are retained in accordance with Section 22 of the PSP as described in Subsection 13.6.4.1.22 of this SER.

The NRC staff has reviewed the applicant's description in T&QP Section 2.6 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.H.1 and therefore is acceptable.

Physical Requalification

The provisions of 10 CFR Part 73, Appendix B, Section VI.B.5 require that: (a) at least annually, armed and unarmed individuals shall be required to demonstrate the capability to meet the physical requirements of this appendix and the applicant's T&QP; and (b) the physical requalification of each armed and unarmed individual must be documented by a qualified training instructor and attested to by a security supervisor.

Section 2.7 of the T&QP describes that physical requalification is conducted at least annually, and documented as described in the PSP and as has otherwise been described in 10 CFR Part 73, Appendix B, Section VI.B.5.

The NRC staff has reviewed the applicant's description in T&QP Section 2.7 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.B.5 and therefore is acceptable.

13.6.4.2.3 Individual Training and Qualification

Duty Training

The provisions of 10 CFR Part 73, Appendix B, Section VI.C.1 provide for duty training and qualification requirements. The regulation states, in part, that all personnel who are assigned to perform any security-related duty or responsibility shall be trained and qualified to perform assigned duties and responsibilities to ensure that each individual possesses the minimum knowledge, skills, and abilities required to effectively carry out those assigned duties and responsibilities. Each individual who is assigned duties and responsibilities identified in the Commission-approved security plans shall be trained before assignment in accordance with the requirements of Part 73, Appendix B, and the T&QP and the PSP. Such personnel must be trained and qualified in the use of all equipment or devices required to effectively perform all assigned duties and responsibilities.

Section 3.1 of the T&QP details the requirements that individuals assigned duties must be trained in their duties, meet minimum qualifications, and be trained and qualified in all equipment or devices required prior to performing their duties.

The NRC staff has reviewed the applicant's description in T&QP Sections 3.0, and 3.1 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.C.1 and therefore are acceptable.

On-The-Job Training

The provisions of 10 CFR Part 73, Appendix B, Section VI.C.2(a) through (c) provide requirements for on-the-job training. On-the-job training performance standards and criteria must ensure that each individual demonstrates the requisite knowledge, skills, and abilities needed to effectively carry out assigned security duties and responsibilities. Individuals assigned contingency duties must complete a minimum of 40 hours of on-the-job training.

On-the-job training for contingency activities and drills must include, but is not limited to, hands-on application of knowledge, skills, and abilities related to: (1) response team duties; (2) use of force; (3) tactical movement; (4) cover and concealment; (5) defensive positions; (6) fields of fire; (7) redeployment; (8) communications (primary and alternate); (9) use of assigned equipment; (10) target sets; (11) table top drills; (12) command and control duties; and (13) applicant protective strategy.

The T&QP provides a comprehensive discussion of the applicant's approach to meeting the requirements for on-the-job training as identified above and covers each of the elements.

The NRC staff has reviewed the applicant's description in T&QP Section 3.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Sections VI.C.2(a) through (c), and therefore is acceptable.

Critical Task Matrix

The provisions of 10 CFR Part 73, Appendix B, Section VI.C.1(b) require, in part, that each individual who is assigned duties and responsibilities identified in the Commission-approved security plans, applicant protective strategy, and implementing procedures shall, before assignment, demonstrate proficiencies in implementing the knowledge, skills and abilities to perform assigned duties.

The T&QP includes a critical task matrix as Table 1 of the T&QP. This matrix addresses the means through which each individual will demonstrate the required proficiencies. Tasks that individuals must perform are listed in RG 5.75.

The NRC staff has reviewed the applicant's description in T&QP Section 3.3 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.C.1(b) and therefore is acceptable.

Initial Training and Qualification Requirements

The provisions of 10 CFR Part 73, Appendix B, Section VI.C.1(a) through (b), provide the requirements for duty training.

The provisions of 10 CFR Part 73, Appendix B, Section VI.D.1and (2), provide requirements for demonstration of qualification.

Section 3.4 of the T&QP describes that the individuals must be trained and qualified prior to performing security-related duties within the security organization, and must meet the minimum qualifying standards in Subsections 3.4.1 and 3.4.2.

Written Examination

The provisions of 10 CFR Part 73, Appendix B, Section VI.D.1(b)(1), provide that written exams must include those elements listed in the Commission-approved T&QP to demonstrate an acceptable understanding of assigned duties and responsibilities, to include the recognition of potential tampering involving both safety and security equipment and systems.

Subsection 3.4.1 of the T&QP describe the measures that are implemented by the applicant to meet the requirements in 10 CFR Part 73, Appendix B, Section VI.D.1(b)(1).

Hands on Performance Demonstration

The provisions of 10 CFR Part 73, Appendix B, Section VI.D.1(b)(2), require that armed and unarmed individuals shall demonstrate hands-on performance for assigned duties and responsibilities by performing a practical hands-on demonstration for required tasks. The hands on demonstration must ensure that theory and associated learning objectives for each required task are considered and that each individual demonstrates the knowledge, skills, and abilities required to effectively perform the task.

Subsection 3.4.2 of the T&QP describe the measures that are implemented by the applicant to meet the requirements in 10 CFR Part 73, Appendix B, Section VI.D.1(b)(2).

The NRC staff has reviewed the applicant's description in T&QP Sections 3.4, 3.4.1, and 3.4.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Sections VI.C.1(b)(1) and VI.D.1(b)(2), and therefore are acceptable.

Continuing Training and Qualification

The provisions of 10 CFR Part 73, Appendix B, Section VI.D.2 state, in part, that armed and unarmed individuals shall be requalified at least annually in accordance with the requirements of this appendix and the Commission-approved T&QP. The results of requalification must be documented by a qualified training instructor and attested to by a security supervisor.

Section 3.5 of the T&QP provides a discussion regarding the management of the requalification program to ensure that each individual is trained and qualified. In part, the applicant's plan provides that annual requalification may be completed up to 3 months before or 3 months after the scheduled date. However, the next annual training must be scheduled 12 months from the previously scheduled date rather than the date the training was actually completed.

The NRC staff has reviewed the applicant's description in T&QP Section 3.5 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.D.2, and therefore is acceptable.

Annual Written Examination

The provisions of 10 CFR Part 73, Appendix B, Section VI.D.1.(b)(3), provide that armed individuals shall be administered an annual written exam that demonstrates the required knowledge, skills, and abilities to carry out assigned duties and responsibilities as an armed member of the security organization. The annual written exam must include those elements listed in the Commission-approved T&QP to demonstrate an acceptable understanding of assigned duties and responsibilities.

Subsection 3.5.1 of the T&QP provides that each individual will be tested, in part, with an annual written exam that at a minimum covers: the role of security personnel; use of deadly force; the requirements in 10 CFR 73.21; authority of private security personnel; power of arrest; search and seizure; offsite law enforcement response; tactics; and tactical deployment and engagement.

The NRC staff has reviewed the applicant's description in T&QP Subsection 3.5.1 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.D.1.(b)(3) and is, therefore, acceptable.

Demonstration of Knowledge Skills and Abilities

The provisions of 10 CFR Part 73, Appendix B, Sections VI.A., B., C., and D. (A.4, C.3(d), D.1(a), and D.1(b)(2)) state, in part, that an individual must demonstrate required knowledge, skills and abilities, to carry out assigned duties and responsibilities.

Subsection 3.5.2 of the T&QP provides that all knowledge, skills and abilities will be demonstrated in accordance with a SAT program, similar to what is described in RG 5.75.

The NRC staff has reviewed the applicant's description in T&QP Subsection 3.5.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Sections VI.A., B., C., and D. and therefore is acceptable.

Weapons Training and Qualification

General Firearms Training

The provisions of 10 CFR Part 73, Appendix B, Section VI.E require that armed members of the security organization shall be trained and qualified in accordance with the requirements of this appendix and the Commission-approved T&QP. Training must be conducted by certified firearms instructors who shall be recertified at least every 3 years. Applicants shall conduct annual firearms familiarization and armed members of the security organization must participate in weapons range activities on a nominal 4 month periodicity.

Subsection 3.6.1 of the T&QP addresses the requirements in 10 CFR Part 73, Appendix B, Sections VI.E.1(d)(1) through (11), and includes provisions for training in the use of deadly force and participation in weapons range activities on a nominal 4 month periodicity. Each armed member of the security organization is trained and qualified by a certified firearms instructor for the use and maintenance of each assigned weapon to include but not limited to, marksmanship, assembly, disassembly, cleaning, storage, handling, clearing, loading, unloading, and reloading, for each assigned weapon.

The NRC staff has reviewed the applicant's description in T&QP Subsection 3.6.1 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.E.1 and therefore is acceptable.

General Weapons Qualification

The provisions of 10 CFR Part 73, Appendix B, Section VI.F.1, "Weapons Qualification and Requalification Program," require that qualification firing must be accomplished in accordance with Commission requirements and the Commission-approved T&QP for assigned weapons. The results of weapons qualification and requalification must be documented and retained as a record.

Subsection 3.6.2 of the T&QP provides that all armed personnel are qualified and requalified with assigned weapons. All weapons qualification and requalification must be documented and retained as a record.

The NRC staff has reviewed the applicant's description in T&QP Subsection 3.6.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.F.1 and therefore is acceptable.

Tactical Weapons Qualification

The provisions of 10 CFR Part 73, Appendix B, Section VI.F.2 require that the applicant conduct tactical weapons qualification. The applicant's T&QP must describe the firearms used, the firearms qualification program, and other tactical training required to implement the

Commission-approved security plans, applicant protective strategy, and implementing procedures. Applicant developed tactical qualification and requalification courses must describe the performance criteria needed to include the site-specific conditions (such as lighting, elevation, fields of fire) under which assigned personnel shall be required to carry out their assigned duties.

Subsection 3.6.3 of the T&QP provides that a tactical qualification course of fire is used to assess armed security force personnel in tactical situations to ensure they are able to demonstrate that their required tactical knowledge, skills and abilities remain proficient.

The NRC staff has reviewed the applicant's description in T&QP Subsection 3.6.3 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.F.2 and therefore is acceptable.

Firearms Qualification Courses

a. The provisions of 10 CFR Part 73, Appendix B, Section VI.F.3, state, in part, that the applicant shall conduct the following qualification courses for each weapon used: an annual daylight fire qualification course; and an annual night fire qualification course.

Courses of Fire

The provisions of 10 CFR Part 73, Appendix B, Section VI.F.4 describe required courses of fire.

Subsection 3.6.4 of the T&QP provides a description of the firearms qualification scores for each of the courses of fire used to ensure armed members of the security organization are properly trained and qualified. Courses of fire are used individually for handguns, semiautomatic rifles, and enhanced weapons.

The NRC staff has reviewed the applicant's description in T&QP Subsection 3.6.4 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.F.3, and 10 CFR Part 73, Appendix B, Section VI.F.4 and therefore is acceptable.

Firearms Requalification

The provisions of 10 CFR Part 73, Appendix B, Section VI.F.5 provide that armed members of the security organization shall be requalified for each assigned weapon at least annually in accordance with Commission requirements and the Commission-approved T&QP, and the results documented and retained as a record. Firearms requalification must be conducted using the courses of fire outlined in 10 CFR Part 73, Appendix B, Sections VI.F.2, VI.F.3, and VI.F.4.

Subsection 3.6.5 of the T&QP states that armed members of the security organization will requalify at least annually with each weapon assigned, using the courses of fire provided in the T&QP.

The NRC staff has reviewed the applicant's description in T&QP Subsection 3.6.5 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.F.5 and therefore is acceptable.

Weapons, Personal Equipment and Maintenance

The provisions of 10 CFR Part 73, Appendix B, Section VI.G provide the requirements for weapons, personal equipment, and maintenance. These requirements provide that the applicant shall provide armed personnel with weapons that are capable of performing the function stated in the Commission-approved security plans, applicant protective strategy, and implementing procedures. In addition, the applicant shall ensure that each individual is equipped or has ready access to all personal equipment or devices required for the effective implementation of the Commission-approved security plans, applicant protective strategy, and implementing procedures.

Section 3.7 of the T&QP describes that personnel are provided with weapons and personnel equipment necessary to meet the plans and the protective strategy. The equipment provided is described in Section 9 of the PSP, and maintenance is performed as described in Section 20 of the PSP. The staff's review of Section 9, "Security Personnel Training" and Section 20, "Maintenance, Testing, and Calibration," of the PSP is in Subsections 13.6.4.1.9 and 13.6.4.1.20 of this SER.

The NRC staff has reviewed the applicant's description in T&QP Section 3.7 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.G, and therefore is acceptable.

Documentation

The provisions of 10 CFR Part 73, Appendix B, Section VI.H require that the applicant retain all reports, records, or other documentation required by this appendix in accordance with the requirements of 10 CFR 73.55(q). The applicant shall retain each individual's initial qualification record for 3 years after termination of the individual's employment and shall retain each requalification record for 3 years after it is superseded. The applicant shall document data and test results from each individual's suitability, physical, and psychological qualification and shall retain this documentation as a record for 3 years from the date of obtaining and recording these results.

Section 3.8 of the T&QP provides that records are retained in accordance with Section 22, "Records," of the PSP. PSP, Section 22.11 describes how the applicant will retain each individual's initial qualification record for three (3) years after termination of the individual's

employment and shall retain each re-qualification record for three (3) years after it is superseded.

The NRC staff has reviewed the applicant's description in T&QP Section 3.8 for the implementation of the site-specific Physical Protection Program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.H and therefore is acceptable.

13.6.4.2.4 Performance Evaluation Program

The provisions in 10 CFR Part 73, Appendix B, Section VI.C.3, "Performance Evaluation Program," state, in part, that:

> (a) [Applicants] shall develop, implement, and maintain a Performance Evaluation Program that is documented in procedures [and] which describes how the [applicant] will demonstrate and assess the effectiveness of their onsite physical protection program and protective strategy, including the capability of the armed response team to carry out their assigned duties and responsibilities during safeguards contingency events. The Performance Evaluation Program and procedures shall be referenced in the [applicant's T&QP].
>
> (b) The Performance Evaluation Program shall include procedures for the conduct of tactical response drills and force-on-force exercises designed to demonstrate and assess the effectiveness of the [applicant's] physical protection program, protective strategy and contingency event response by all individuals with responsibilities for implementing the [SCP].
>
> …
>
> (l) The Performance Evaluation Program must be designed to ensure that: (1) Each member of each shift who is assigned duties and responsibilities required to implement the [SCP] and [applicant] protective strategy participates in at least one (1) tactical response drill on a quarterly basis and one (1) force-on-force exercise on an annual basis[.]

Section 4 of the T&QP details the performance evaluation program consistent with the requirements of 10 CFR Part 73, Appendix B, Section VI.C.3(a) through (m). Additional details of the performance evaluation program are described in the facility procedures.

The NRC staff has reviewed the applicant's description in T&QP Section 4 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, Section VI.C.3 and therefore is acceptable.

13.6.4.2.5 Definitions

The provisions of 10 CFR Part 73, Appendix B, Section VI.J, state, in part, that terms defined in 10 CFR Part 50, 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," and 10 CFR Part 73 have the same meaning when used in this appendix. Definitions are found in the PSP, Appendix A, "Glossary of Terms and Acronyms".

Included in this section of the T&QP is the Critical Task Matrix, which is considered SGI and has not been included in this SER.

The NRC staff has reviewed the applicant's description in T&QP of the Critical Task Matrix tasks for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the T&QP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the T&QP meets the requirements of 10 CFR Part 73, Appendix B, and therefore is acceptable.

13.6.4.2.6 Conclusion on the Training and Qualification Plan

On the basis of the NRC staff's review described in Subsections 13.6.4.2.1 through 13.6.4.2.5 of this SER, the Fermi 3 T&QP meets the requirements of 10 CFR Part 73, Appendix B. The target sets, target set analysis, and site protective strategy will be in the facility implementing procedures, which are not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii). The NRC staff concludes that complete and procedurally correct implementation will provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety.

13.6.4.3 *Appendix C Safeguards Contingency Plan*

13.6.4.3.1 Background Information

This category of information identifies the perceived dangers and incidents that the plan addresses and a general description of how the response is organized.

Purpose of the Safeguards Contingency Plan

The provisions of 10 CFR Part 73, Appendix C, Section II.B.1.b, indicate that the applicant should discuss general goals, objectives and operational concepts underlying the implementation of the SCP.

Section 1.1 of the SCP describes the purpose and goals of the SCP, including guidance to security and management for contingency events.

Scope of the Safeguards Contingency Plan

The provisions of 10 CFR Part 73, Appendix C, Section II.B.1.c, delineate the types of incidents that should be covered by the applicant in the SCP, how the onsite response effort is organized and coordinated to effectively respond to a safeguards contingency event, and how the onsite

response for safeguards contingency events has been integrated into other site emergency response procedures.

Section 1.2 of the SCP states the scope of the SCP to analyze and define decisions and actions of security force personnel, as well as facility operations personnel, for achieving and maintaining safe shutdown.

Perceived Danger

The provisions of 10 CFR Part 73, Appendix C, Section II.B.1.a, require that, consistent with the DBT specified in 10 CFR 73.1(a)(1), the applicant shall identify and describe the perceived dangers, threats, and incidents against which the SCP is designed to protect.

Section 1.3 of the SCP outlines the threats used to design the physical protection systems.

The applicant adequately addresses perceived danger, provides a purpose of the plan, and describes the scope of the plan.

Definitions

Section 1.4 of the SCP describes that a list of terms and their definitions used in describing operational and technical aspects of the approved SCP as required by 10 CFR Part 73, Appendix C, Section II.B.1.d is found in Appendix A of the PSP.

The NRC staff has reviewed the applicant's description in SCP Sections 1, 1.1, 1.2, 1.3, and 1.4 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the SCP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the SCP meets the requirements of 10 CFR Part 73, Appendix C, Section II.B.1 and therefore are acceptable.

13.6.4.3.2 Generic Planning Base

As required in 10 CFR Part 73, Appendix C, Section II.B.2., this section of the plan defines the criteria for initiation and termination of responses to security events to include the specific decisions, actions, and supporting information needed to respond to each type of incident covered by the approved SCP.

Situations Not Covered by the Contingency Plan

Section 2.1 of the SCP details the general types of conditions that are not covered in the plan.

Situations Covered by the Contingency Plan

The provisions of 10 CFR Part 73, Appendix C, Section II.B.2.a, require, in part, that the plan identify those events that will be used for signaling the beginning or aggravation of a safeguards contingency according to how they are perceived initially by the applicant's personnel. Applicants shall ensure detection of unauthorized activities and shall respond to all alarms or other indications signaling a security event, such as penetration of a PA, vital area, or unauthorized barrier penetration (vehicle or personnel); tampering, bomb threats, or other threat

warnings—either verbal, such as telephoned threats, or implied, such as escalating civil disturbances.

The provisions of 10 CFR Part 73, Appendix C, Section II.B.2.b, require, in part, that the plan define the specific objective to be accomplished relative to each identified safeguards contingency event. The objective may be to obtain a level of awareness about the nature and severity of the safeguards contingency to prepare for further responses; to establish a level of response preparedness; or to successfully nullify or reduce any adverse safeguards consequences arising from the contingency.

The provisions of 10 CFR Part 73, Appendix C, Section II.B.2.c require, in part, that the applicant identify the data, criteria, procedures, mechanisms and logistical support necessary to achieve the objectives identified.

Section 2.2 of the SCP describes in detail the specific situations it covers, provides a list of objectives for each event, and provides data necessary for each event.

The NRC staff has reviewed the applicant's description in SCP Sections 2, 2.1 and 2.2 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the SCP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the SCP meets the requirements of 10 CFR Part 73, Appendix C Section II.B.2 and therefore are acceptable.

13.6.4.3.3 Responsibility Matrix

The provisions of 10 CFR Part 73, Appendix C, Section II.B.4 state that this category of information consists of the detailed identification of responsibilities and specific actions to be taken by the applicant's organizations and/or personnel in response to safeguards contingency events. To achieve this result the applicant must address the following:

- The provisions of 10 CFR Part 73, Appendix C, Section II.B.4.a require, in part, that the applicant develop site procedures that consist of matrixes detailing the organization and/or personnel responsible for decisions and actions associated with specific responses to safeguards contingency events. The responsibility matrix and procedures must be referenced in the applicant's SCP.

- The provisions of 10 CFR Part 73, Appendix C, Section II.B.4.b require, in part, that the responsibility matrix procedures shall be based on the events outlined in the applicant's generic planning base and must include specific objectives to be accomplished, descriptions of responsibilities for decisions and actions for each event, and overall description of response actions each responding entity.

- The provisions of 10 CFR Part 73, Appendix C, Section II.B.4.c require in part, that responsibilities are to be assigned in a manner that precludes conflict of duties and responsibilities that would prevent the execution of the SCP and emergency response plans.

- The provisions of 10 CFR Part 73, Appendix C, SectionII.B.4.d require, in part, that the applicant ensure that predetermined actions can be completed under the postulated conditions.

Section 3 of the SCP includes a responsibility matrix, as required by Appendix C, Section II.B.4.a. The responsibility matrix integrates the response capabilities of the security organization (described in Section 4 of the SCP) with the background information relating to decision/actions and organizational structure (described in Section 1 of the SCP), as required by Appendix C, Section II.B.4.a. The responsibility matrix provides an overall description of the response actions and their interrelationships, as required by Appendix C, Section II.B.4.b. Responsibilities and actions have been predetermined to the maximum extent possible and assigned to specific entities to preclude conflicts that would interfere with or prevent the implementation of the SCP or the ability to protect against the DBT of radiological sabotage, as required by Appendix C, Section II.B.4.c. The applicant has described how it will ensure that predetermined actions can be completed under the postulated conditions as required by Appendix C, Section II.B.4.d.

The NRC staff has reviewed the applicant's description in SCP Section 3 for the implementation of the site-specific physical Protection Program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the SCP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the SCP meets the requirements of 10 CFR Part 73, Appendix C, Section II.B.4 and therefore is acceptable.

13.6.4.3.4 Licensee Planning Base

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3 require, in part, that the applicant's planning base include factors affecting the SCP that are specific for each facility.

Licensee Organization

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3.a require, in part, that the SCP describe the organization's chain of command and delegation of authority during safeguards contingency events, to include a general description of how command and control functions will be coordinated and maintained.

Duties/Communication Protocols

Subsection 4.1.1 of the SCP details the duties and communications protocols of each member of the security organization responsible for implementing any portion of the applicant's protective strategy, which will allow for coordination and maintenance of command and control functions as required by Appendix C, Section II.B.3.a.

Security Chain of Command/Delegation of Authority

Subsection 4.1.2 of the SCP describes in detail the chain of command and delegation of authority during contingency events, and this is also described in the responsibility matrix portions of the SCP. The chain of command and delegation of authority during normal operations is discussed in the PSP. Accordingly, the staff concludes that the applicant has

described the chain of command and delegation of authority during contingency events as required by Appendix C, Section II.B.3.a.

Physical Layout

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3.b, require, in part, that the SCP include a site map depicting the physical structures located on the site, including onsite independent spent fuel storage installations, and a description of the structures depicted on the map. Plans must also include a description and map of the site in relation to nearby towns, transportation routes (e.g., rail, water, and roads), pipelines, airports, hazardous material facilities, and pertinent environmental features that may have an effect upon coordination of response activities. Descriptions and maps must indicate main and alternate entry routes for law enforcement or other offsite response and support agencies and the location for marshaling and coordinating response activities.

Section 4.2 of the SCP references Sections 1.1 and 14.5 of the PSP for layouts of the OCA, PA, vital areas, site maps, and descriptions of site features. The staff confirmed that these layouts, maps, and descriptions include the detailed information required by Appendix C, Section II.B.3.b and described above.

Safeguards Systems

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3.c require, in part, that the SCP include a description of the physical security systems that support and influence how the applicant will respond to an event in accordance with the DBT described in 10 CFR 73.1(a). The description must begin with onsite physical protection measures to be implemented at the outermost facility perimeter, and must move inward through those measures to be implemented to protect target set equipment.

Section 4.3 of the SCP describes that safeguards systems are described in PSP Sections 9, 11, 12, 13, 15 and 16, and in the facility implementing procedures/documents. Section 8 of the SCP describes how physical security systems will be used to respond to a threat at the site, as required by Appendix C, Section II.B.3.c. As further required by Appendix C, Section II.B.3.c, the SCP description begins with physical protection measures proposed at the outermost facility perimeter, and moves inward through those measures proposed to protect target set equipment.

Law Enforcement Assistance

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3.d require, in part, that the applicant provide a listing of available law enforcement agencies, a general description of their response capabilities, their criteria for response, and a discussion of working agreements or arrangements for communicating with these agencies.

Section 4.4 of the SCP states in detail the role of LLEA in the site protective strategy. In accordance with Appendix C, Section II.B.3.d, these details include LLEA response capabilities, LLEA criteria for response, and the working agreements or arrangements for communicating with these LLEAs. Additional details regarding LLEA are included in Section 8 of the PSP and Section 5.6 of the SCP.

Policy Constraints and Assumptions

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3.e require, in part, that the SCP include a discussion of State laws, local ordinances, and company policies and practices that govern the applicant's response to incidents. These must include, but are not limited to, the following: 1) use of deadly force; 2) recall of off-duty employees; 3) site jurisdictional boundaries, and 4) use of enhanced weapons, if applicable.

Section 4.5 of the SCP details the site security policies, including the use of deadly force, provisions for the recall of off-duty employees, site jurisdictional boundaries, and authority to request offsite assistance, as required by Appendix C, Section II.B.3.e.

Administrative and Logistical Considerations

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3.f require, in part, that the applicant provide descriptions of practices which influence how the security organization responds to a safeguards contingency event to include, but not limited to, a description of the procedures that will be used for ensuring that equipment needed to facilitate responses will be readily accessible, in good working order, and in sufficient supply.

Section 4.6 of the SCP outlines administrative duties of the Manager-Nuclear Security and the Security Shift Supervisor, and the use of facility procedures and administrative forms.

The NRC staff has reviewed the applicant's description in SCP Sections 4, 4.1, 4.1.1, 4.1.2, and 4.2 through 4.6 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the SCP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the SCP meets the requirements of 10 CFR Part 73, Appendix C, Section II.B.3 and therefore are acceptable.

13.6.4.3.5 Response Capabilities

This section outlines the response by the applicant to threats to the facility. As set forth below, the applicant describes in detail how they protect against the DBT with onsite and offsite organizations, in accordance with the regulations in 10 CFR 50.54(p)(1) and (hh)(1), 10 CFR 73.55(k), 10 CFR Part 73, Appendix B, Section VI and 10 CFR Part 73, Appendix C, Section II.B.3. In addition, Appendix C, "Introduction," states, in part, that it is important to note that an applicant's SCP is intended to be complementary to any emergency plans developed pursuant to Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," of 10 CFR Part 50 and 10 CFR 52.79, "Contents of Applications; Technical Information and FSAR.

Response to Threats

Section 5.1 of the SCP describes the protective strategy design to defend the facility against all aspects of the DBT. Each organization has defined roles and responsibilities.

Armed Response Force

Section 5.2 of the SCP notes the individuals included in the responsibility matrix and their role in the site protective strategy. This section also notes the minimum number of individuals and their contingency equipment for implementation of the protective strategy. The applicant described the armed response team consistent with 10 CFR 73.55(k)(4), (5), (6) and (7), 10 CFR Part 73, Appendix B, Section VI, and 10 CFR Part 73, Appendix C, Section II.B.3.

Supplemental Security Officer

Section 5.3 of the SCP describes in detail the use of supplemental security officers in the site protective strategy. The applicant described the use of supplemental security officers, consistent with the requirements in 10 CFR 73.55(k)(4).

Facility Operations Response

Section 5.4 of the SCP describes the role of operations personnel in the site protective strategy, including responsibilities, strategies and conditions for operator actions as discussed in 10 CFR 50.54(hh)(1).

Emergency Plan Response

Section 5.5 of the SCP notes the integration of the Emergency Plan (EP) with the applicant's protective strategy, and it gives some examples of how the Emergency Plan can influence the protective strategy as discussed in 10 CFR 73.55(b)(11).

Local Law Enforcement Agencies (LLEA)

Section 5.6 of the SCP documents the current agreements with applicable LLEA, and therefore meets the requirements of 10 CFR 73.55(k)(9) and 10 CFR Part 73, Appendix C, Section II.B.3.d and lists the LLEAs that will respond to the site as a part of the protective strategy. Details on the LLEA response are located in Section 8 of the PSP. Further, Section 5.6 provides a general description of the LLEA response capability and meets the corresponding portions of 10 CFR 73.55(k)(9).

State Response Agencies

Section 5.7 of the SCP documents the current agreements with applicable LLEA, and therefore meets the requirements of 10 CFR 73.55(k)(9) and 10 CFR Part 73, Appendix C, Section II.B.3.d and lists the State response agencies that will respond to the site as a part of the protective strategy. Further Section 5.7 provides a general description of the LLEA response capability and meets the corresponding portions of 10 CFR 73.55(k)(9).

Federal Response Agencies

Section 5.8 of the SCP documents the current agreements with applicable LLEA, and therefore meets the requirements of 10 CFR 73.55(k)(9) and 10 CFR Part 73, Appendix C, Section II.B.3.d and lists the Federal response agencies that will respond to the site as a part of

the protective strategy. Further Section 5.8 provides a general description of the LLEA response capability and meets the corresponding portions of 10 CFR 73.55(k)(9).

Response to Independent Spent Fuel Storage Installation (ISFSI) Events

Section 5.9 of the SCP meets the requirements of 10 CFR 73.55(k)(9) and 10 CFR Part 73, Appendix C, Section II.B.3.d, and describes the Response Requirements for Independent spent Fuel Storage Installation (ISFSI) as a part of the protective strategy.

In RAI 13.06.01-55, the NRC staff asked for additional information on the physical security protection measures for the existing ISFSI in the current Fermi 2 operating plant PA, and requested justification for the omission of information from the Fermi 2 PSP, including Appendix D, in the Fermi 3 PSP.

In a letter dated September 23, 2011, the applicant submitted a revised the PSP, Revision 5, to include information in Appendix C, Section 5.9, and Appendix D relative to the protection of the ISFSI located within the PA, consistent with the existing Fermi 2 PSP.

The NRC staff finds the responses to RAI 13.06.01-55 acceptable, as it provided details on how the applicant meets the requirements in 10 CFR Part 73 for physical protection of an ISFSI. Therefore, this RAI 13.06.01-55 is closed.

The NRC staff has reviewed the applicant's description in SCP Sections 5.0 through 5.9 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the SCP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the SCP meet the requirements of 10 CFR 50.54(p)(1) and 10 CFR 50.54(hh)(1), 10 CFR 73.55(k), 10 CFR Part 73, Appendix B, Section VI and 10 CFR Part 73, Appendix C, Section II.B.3 and therefore are acceptable. In addition, Appendix C, "Introduction" states, in part, that it is important to note that an applicant's SCP is intended to be complementary to any EPs developed pursuant to Appendix E to 10 CFR Part 50 and 10 CFR 52.17.

13.6.4.3.6 Defense-In-Depth

Section 6 of the SCP lists site physical security characteristics, programs, and strategy elements intended to illustrate the defense in depth nature of the site protective strategy, as required in 10 CFR 73.55(b)(3).

The NRC staff has reviewed the applicant's description in SCP Section 6 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the SCP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the SCP meets the requirements of 10 CFR 73.55(b)(3) and therefore are acceptable.

13.6.4.3.7 Primary Security Functions

Section 7 of the SCP details the primary security functions of the site, and their roles in the site protective strategy. It also notes the development of target sets, and their function in the development of the applicant's protective strategy.

The NRC staff has reviewed the applicant's description in SCP Section 7 for the implementation of the site-specific physical protection program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the SCP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the SCP meets the requirements of 10 CFR 73.55(b) and therefore is acceptable.

13.6.4.3.8 Protective Strategy

The provisions of 10 CFR Part 73, Appendix C, Section II.B.3.c(v) require that applicants develop, implement, and maintain a written protective strategy that shall: 1) be designed to meet the performance objectives of 10 CFR 73.55 (a) through (k); 2) identify predetermined actions, areas of responsibilities, and timelines for the deployment of armed personnel; 3) include measures that limit the exposure of security personnel to possible attack; 4) include a description of the physical security systems and measures that provide defense in depth; 5) describe the specific structure and responsibilities of the armed response organization; and 6) provide a command and control structure.

Section 8 of the SCP describes the site protective strategy.

In RAI 13.06.01-33, the NRC staff asked for clarification of the duties and number of officers that are described in the last paragraph of page C-34 and the last paragraph of C-33.

The NRC staff finds the response to RAI 13.06.01-33 acceptable as it provides clarification on the site protective strategy that will be implemented in compliance with 10 CFR Part 73, Appendix C, Section II.B.3.c.(v). Therefore, this RAI 13.06.01-33 is closed.

The NRC staff has reviewed the applicant's description in SCP Section 8 for the implementation of the site-specific Physical Protection Program in accordance with Commission regulations and NUREG-0800 acceptance criteria. Because the applicant's description in the SCP is consistent with the acceptance criteria in NUREG-0800, Subsection 13.6.1, the staff finds that the description provided in the SCP meets the requirements of 10 CFR 73.55(a) through (r) and 10 CFR Part 73, Appendix C and therefore is acceptable.

13.6.4.3.9 Conclusions on the Safeguards Contingency Plan

Accordingly, the NRC staff's review described in Subsections 13.6.4.3.1 through 13.6.4.3.8 of this SER, the SCP meets the requirements of 10 CFR Part 73, Appendix C, in accordance with the DBT of radiological sabotage as stated in 10 CFR 73.1. The target sets, target set analysis, and site protective strategy will be in facility implementing procedures, which are not subject to NRC staff review as part of this COL application and are, therefore, subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii). The NRC staff concludes that complete and procedurally correct implementation of the SCP will provide high assurance that activities involving special nuclear

material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety.

13.6.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the staff finds the following license condition to track implementation of the Physical Security Program, the Safeguards Contingency Program, and the Training and Qualification Program, acceptable.

> License Condition (13.6-1) No later than 12 months after issuance of the COL, the licensee shall submit to the Director of NRO, or the Director's designee, a schedule for implementation of the operational programs listed in FSAR Table 13.4-201, including the associated estimated date for initial loading of fuel. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the operational programs in the FSAR table have been fully implemented.

Commitment 13.4-017: The applicant identified the following commitments to track implementation of the Physical Security Program, the Safeguards Contingency Program, and the Training and Qualification Program:

1. Physical Security Program - Implemented prior to fuel onsite [COM 13.4-017]
2. Safeguards Contingency Program - Implemented prior to fuel onsite [COM 13.4-017]
3. Training and Qualification Program - Implemented prior to fuel onsite [COM 13.4-017]

13.6.6 Conclusions

The NRC staff reviewed the application and checked the referenced DCD. The NRC staff's review confirmed that the applicant addressed the required information relating to physical security, and there is no outstanding information that needs to be addressed in the Fermi COL FSAR related to this section. The results of the NRC staff's technical evaluation of the information incorporated by reference in the Fermi COL application are documented in NUREG-1966.

The staff concludes that the relevant information presented in the Fermi COL FSAR is acceptable based on the applicable regulations specified in Subsection 13.6.4 of this SER. The staff based its conclusion on the following:

- The NRC staff's review of the PSP, T&QP and SCP has focused on ensuring the necessary programmatic elements are included in these plans in order to provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety.

- As described in this section, the NRC staff has determined that these plans include the necessary programmatic elements that, when effectively implemented, will provide the required high assurance. The burden to effectively implement these plans remains with the applicant. Effective implementation is dependent on the procedures and practices the applicant develops to satisfy the programmatic elements of its PSP, T&QP, and

SCP. The target sets, target set analysis and site protective strategy are in the facility implementing procedures, which were not subject to NRC staff review as part of this COL application, and are therefore subject to future NRC inspection in accordance with 10 CFR 73.55(c)(7)(iv) and 10 CFR Part 73, Appendix C, Section II.B.5(iii). As provided by Section 3 of the applicant's PSP, a performance evaluation program will be implemented that periodically tests and evaluates the effectiveness of the overall protective strategy. This program provides that deficiencies be corrected. In addition, NRC inspectors will conduct periodic force-on-force exercises that will test the effectiveness of the applicant's protective strategy. Based on the results of the applicant's own testing and evaluation, the NRC's baseline inspections and force-on-force exercises, enhancements to the applicant's PSP, T&QP, and SCP may be necessary to ensure that the overall protective strategy can be effectively implemented. As such, the NRC staff approval of the applicant's PSP, T&QP, and SCP is limited to the programmatic elements necessary to provide the required high assurance as stated above. Should deficiencies be identified with the programmatic elements of these plans as a result of the periodic applicant or NRC conducted drills or exercises that test the effectiveness of the overall protective strategy, the plans shall be corrected to address these deficiencies in a timely manner and the applicant should notify the NRC of these plan changes in accordance with the requirements of 10 CFR 50.54(p) or 10 CFR 50.90.

The COL applicant's security plan information is withheld from public disclosure in accordance with the provisions of 10 CFR 73.21.

13.6A Site-Specific Inspection, Test, Analysis, and Acceptance Criteria for Physical Security

13.6A.1 Introduction

The Fermi 3 COL application describes in Part 10, "Proposed License Conditions (Including ITAAC)" "Inspection, Test, Analysis, and Acceptance Criteria" of the license conditions for the plant's physical protection systems or features to provide physical protection of the site specific protective strategy and elements of a site security program. The COL application incorporates by reference the standard ESBWR design including physical protection systems within the design of the vital island and vital structures. The COL application incorporates by reference the ESBWR plant layout and configurations of barriers, and listed ITAAC related to the site-specific design for achieving detection, assessment, communications, delay, and response for physical protection against potential acts of radiological sabotage and theft of special nuclear material.

The design bases or supporting security analyses and assumptions related to the design descriptions of security-related features incorporated as reference from the ESBWR DCD is Tier 2 information, including NEDE-33391, "The ESBWR Safeguards Assessment Report," NEDE-33390, "The ESBWR Interim Compensatory Measures Report" and NEDE-33389, "The ESBWR Security Enhancement Report." Descriptions of site specific security structures, programs and contingency measures are located in the Fermi Physical Security Plan, which includes the site physical security plan (PSP), training and qualification plan, and the safeguards contingency plan.

13.6A.2 Summary of Application

Section 14.3 of the Fermi 3 COL FSAR, Revision 7 incorporates by reference the Table 2.19-1 of the ESBWR DCD Revision 10 and TRs. Part 10, Revision 4, Section 2.2, of the Fermi COL application incorporates by reference the Physical Security ITAAC (PS-ITAAC) for systems within the scope of the DCD Tier 1. Part 10, Revision 4, Section 2.2.1 also listed the Site Specific Physical Security ITAAC and Design Description.

In addition, in DTE COL FSAR Section 14.3, the applicant provided the following:

COL Information

- STD COL 14.3-2-A Site-Specific ITAAC

The selection criteria and methodology provided in this section of the referenced DCD were utilized as the site-specific selection criteria and methodology for ITAAC. These criteria and methodology were applied to those site-specific (SS) systems that were not evaluated in the referenced DCD. The entire set of ITAAC for the facility, including DC-ITAAC, EP-ITAAC, PS-ITAAC, and SS-ITAAC, is included in the [COL application] Part 10.

License Condition

- Part 10, License Condition
- Operational Program Readiness

  The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first. This schedule shall also address:

  a. The implementation of site specific Severe Accident Management Guidance.
  b. The spent fuel rack coupon monitoring program implementation.

13.6A.3 Regulatory Basis

The regulatory basis on the information incorporated by reference is addressed in the FSER related to the ESBWR DCD. In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations are given in 10 CFR Part 73. 10 CFR Part 73 includes specific security and performance requirements that, when adequately implemented, are designed to protect nuclear power reactors against acts of radiological sabotage, prevent the theft or diversion of special nuclear material, and protect SGI against unauthorized release.

Regulation in 10 CFR 52.80(a) requires that information submitted in a COL application include the proposed ITAAC that the licensee shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the ITAAC are met, the facility

has been constructed and will operate in conformity with the COL, the provisions of the Atomic Energy Act, and the NRC's regulations.

The Fermi 3 design descriptions, commitments, and acceptance criteria for the security features, including the plant's layout and determination of vital equipment and areas, for a certified design that is based on physical protection systems or hardware provided for meeting requirements including the following Commission regulations:

- 10 CFR Part 50
- 10 CFR Part 52
- 10 CFR 73.1(a)(1), "Radiological sabotage"
- 10 CFR 73.55
- 10 CFR Part 73, Appendix B, "General Criteria for Security Personnel"
- 10 CFR Part 73, Appendix C, "Nuclear Power Plant Safeguards Contingency Plans"
- 10 CFR Part 73, Appendix G, "Reportable Safeguards Events"
- 10 CFR Part 73, Appendix H, "Weapons Qualification Criteria"
- 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material"
- 10 CFR 100.21(f), "Non-Seismic Siting Criteria"

Regulatory requirements and acceptance criteria related to physical protection systems or hardware are identified in Section 14.3.12 of NUREG-0800.

Regulatory guidance documents that are applicable to this evaluation are:

- RG 1.91 "Evaluations of Explosions Postulated to Occur at Transportation Routes Near Nuclear Power Plants," Revision 1
- RG 1.206
- RG 4.7 "General Site Suitability Criteria for Nuclear Power Stations," Revision 2
- RG 5.7 "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas," Revision 1
- RG 5.12
- RG 5.29, "Nuclear Material Control and Accounting for Nuclear Power Reactors"
- RG 5.44, "Perimeter Intrusion Alarm Systems," Revision 3
- RG 5.62, "Reporting of Safeguards Events," Revision 1
- RG 5.65
- RG 5.66
- Information Notice 86-83, "Underground Pathways into Protected Areas, Vital Areas, and Controlled Access Areas," September 19, 1986.

- Regulatory Information Summary 2005-04, "Guidance on the Protection of Unattended Openings that Intersect a Security Boundary or Area," April 14, 2005 (Exempt from public disclosure in accordance with 10 CFR 2.390)

The COL applicant is required to describe commitments for establishing and maintaining a physical protection system (engineered and administrative controls), organization, programs, and procedures for implementing a site-specific strategy that demonstrate, if adequately implemented, high assurance of protection of the plant against the DBT. The site-specific physical protection system described must be reliable and available and implement the concept of defense-in-depth protection in order to provide a high assurance of protection. The security operational programs and the physical protection system are required to meet specific and performance requirements of 10 CFR Part 26, 10 CFR 73.54, 10 CFR 73.55, 10 CFR 73.56, 10 CFR 73.57, and 10 CFR 73.58. Within this context, the DC applicant is required only to address those elements or portion of physical protection system or features that are considered within the scope of design. The technical basis for physical protection hardware within the scope of the design provides the basis for ITAAC verification and closure.

13.6A.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed Section 14.3 of the ESBWR DCD, Revision 10, and checked to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The NRC staff's review confirmed that the information in the application and incorporated by reference addresses the required information relating to ITAAC for physical security. The results of the NRC staff's evaluation of the information incorporated by reference in the Fermi 3 COL application are documented in NUREG-1966 and its supplements.

The staff reviewed the information in the Fermi 3 COL FSAR:

COL Information

- STD COL 14.3-2-A Site-Specific ITAAC

STD COL 14.3-2-A adds the following after DCD Section 14.3.9.

> The selection criteria and methodology provided in this section of the referenced DCD were utilized as the site-specific selection criteria and methodology for ITAAC. These criteria and methodology were applied to those site-specific (SS) systems that were not evaluated in the referenced DCD. The entire set of ITAAC for the facility, including DC-ITAAC, EP-ITAAC, PS-ITAAC, and SS-ITAAC, is included in COLA Part 10.

In Part 10, of the Fermi 3 COL application, Detroit Edison describes the PS-ITAAC for the plant's physical protection systems or features to provide physical protection of the site-specific protective strategy and elements of a site security program. The COL application incorporates by reference Tier 1, Table 2.19-1 of the ESBWR DCD, including plant layout and configurations of barriers, and listed ITAAC related to the site-specific design for achieving detection,

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

assessment, communications, delay, and response for physical protection against potential acts of radiological sabotage and theft of special nuclear material. DCD Tier 1, Table 2.19-1 includes the PS-ITAACs that are in the scope of the ESBWR standard design. Site-specific PS-ITAAC that are outside the scope of the ESBWR DCD Tier 1, Table 2.19-1 are provided in Table 2.2.1-1 of Part 10 of the Fermi 3 COL application.

The NRC staff's evaluation of the PS-ITAAC (STD COL 14.3-2-A) is documented in the Sections 13.6A.4.1 through 13.6A.4.3 of this SER.

13.6A.4.1 *Detection and Assessment Hardware*

The applicant submitted PS-ITAAC, in Revision 4 of the Fermi 3 COL application, Part 10, Table 2.2.1-1, "ITAAC for the Site-Specific Security System." The Fermi 3 COL application incorporates by reference the ESBWR DCD Tier 1, Table 2.19-1, Revision 10, design commitments and ITAAC for the physical security system to be used at Fermi 3.

The physical security system provides physical features to detect, delay, assist response to, and defend against the DBT for radiological sabotage. The physical security system consists of physical barriers and an intrusion detection system. The details of the physical security system are categorized as SGI. The physical security system provides protection for vital equipment and plant personnel.

The PS-ITAAC reference numbers listed below are from NUREG-0800, SRP Section 14.3.12, "Physical Security Hardware - Appendix "A"," and are used to provide clarification of the ITAAC related to "Detection and Assessment Hardware."

PS-ITAAC 2 Protected Area Barrier:

a. Physical barriers for the protected area perimeter will not be part of vital area barriers.
b. Penetrations through the protected area barrier will be secured and monitored.
c. Unattended openings that intersect a security boundary, such as underground pathways, will be protected by a physical barrier and monitored by intrusion detection equipment or provided surveillance at a frequency sufficient to detect exploitation.

PS-ITAAC 3 Isolation Zone:

a. Isolation zones will exist in outdoor areas adjacent to the physical barrier at the perimeter of the protected area and will be designed of sufficient size to permit observation and assessment on either side of the barrier.
b. Isolation zones will be monitored with intrusion detection and assessment equipment that is designed to provide detection and assessment of activities within the isolation zone.
c. Areas where permanent buildings do not allow sufficient observation distance between the intrusion detection system and the protected area barrier (e.g., the building walls are immediately adjacent to, or are an integral part of the protected area barrier) will be monitored with intrusion detection and assessment equipment that is designed to detect the attempted or actual

penetration of the protected area perimeter barrier before completed penetration of the barrier and assessment of detected activities.

PS-ITAAC 4 Protected Area Perimeter Intrusion Detection and Assessment Systems :

a. The perimeter intrusion detection system will be designed to detect penetration or attempted penetration of the protected area perimeter barrier before completed penetration of the barrier, and for subsequent alarms to annunciate concurrently in at least two continuously manned onsite alarm stations (central and secondary alarm stations).

b. The perimeter assessment equipment will be designed to provide video image recording with real-time and playback capability that can provide assessment of detected activities before and after each alarm annunciation at the protected area perimeter barrier.

c. The intrusion detection and assessment equipment at the protected area perimeter will be designed to remain operable from an uninterruptible power supply in the event of the loss of normal power.

PS-ITAAC 6 Bullet Resistant Barriers Requirements:

The external walls, doors, ceiling, and floors in the Secondary Alarm Station, and the last access control function for access to the protected area will be bullet resistant, to at least Underwriters Laboratories Ballistic Standard 752, “The Standard of Safety for Bullet-Resisting Equipment,” Level 4, or National Institute of Justice Standard 0108.01, “Ballistic Resistant Protective Materials,” Type III.

PS-ITAAC 9 Picture Badge Identification System Requirements:

An access control system with a numbered photo identification badge system will be installed and designed for use by individuals who are authorized access to protected areas and vital areas without escort.

Accordingly, the NRC staff determined that the Fermi 3 COL application, Part 10, Table 2.2.1-1 has adequately addressed the requirements related to the PS-ITAAC for Detection and Assessment Hardware Items 2(a), 2(b), 2(c), 3(a), 3(b), 3(c), 4(a), 4(B), 4(c), 6 partially, and 9 as identified in Appendix A to Section 14.3.12 of NUREG-0800.

The Fermi 3 COL application, Part 10, Table 13.4-201 and Part 10, Section 3 has adequately addressed the requirements of 10 CFR 73.55(a)(4).

The Fermi 3 COL application, Part 10, Table 2.2.1-1 partially addressed PS-ITAAC 6. The application references the ESBWR DCD, which also partially addressed PS-ITAAC 6. The NRC staff determined the between both the Fermi 3 COL and the ESBWR DCD all elements of the PS-ITAAC 6 are adequately addressed as identified in Appendix A to Section 14.3.12 of NUREG-0800.

The staff has determined that the Detection and Assessment Hardware PS-ITAAC, described in NUREG-0800, Section 14.3.12 has been fully addressed between the Fermi 3 submission and the ESBWR DCD.

13.6A.4.2 *Delay or Barrier Design*

The applicant submitted PS-ITAAC, in Revision 4 of the Fermi 3 COL application, Part 10, Table 2.2.1-1, “ITAAC for the Site-Specific Security System”. The Detroit Edison Fermi 3 COLA incorporates by reference the ESBWR DCD Tier 1, Table 2.19-1, Revision 10, design commitments and ITAAC for the physical security system to be used at the Fermi 3.

The PS-ITAAC listed below reference numbers are from NUREG-0800, SRP Section 14.3.12, “Physical Security Hardware - Appendix "A”," and are used to provide clarification of the ITAAC related to “Delay or Barrier Design.”

PS-ITAAC 1 Vital Area and Vital Area Barrier:

a. Vital equipment will be located only within a vital area.
b. Access to vital equipment will require passage through at least two physical barriers.

PS-ITAAC 8 Personnel, Vehicle, and Material Access Control Portals and Search Equipment:

a. Access control points will be established and designed to control personnel and vehicle access into the protected area.
b. Access control points will be established and designed with equipment for the detection of firearms, explosives, and incendiary devices at the protected area personnel access points.

Accordingly, the NRC staff determined that the Fermi 3 COL application, Part 10, Table 2.2.1-1 has adequately addressed, PS-ITAAC for Delay or Barrier Design Items 8(a), 8(b), identified in Appendix A to Section 14.3.12 of NUREG-0800.

The Fermi 3 COL application, Part 10, Table 2.2.1-1 partially addressed PS-ITAAC 1(a) and 1(b). The application references the ESBWR DCD, which also partially addressed PS-ITAAC 1(a) and 1(b). The NRC staff determined that between both the Fermi 3 COL and the ESBWR DCD all elements of the PS-ITAAC 1(a) and 1(b) are adequately addressed as identified in Appendix A to Section 14.3.12 of NUREG-0800.

The staff has determined that PS-ITAAC described in NUREG-0800, Section 14.3.12 has been fully addressed between the Fermi 3 submission and the ESBWR DCD.

13.6A.4.3 *Systems, Hardware, or Features Facilitating Security Response and Neutralization*

The applicant submitted PS-ITAAC, in Revision 4 of the Fermi 3 COL application, Part 10, Table 2.2.1-1, “ITAAC for the Site-Specific Security System”. The Detroit Edison Fermi 3 COL application incorporates by reference the ESBWR DCD Tier 1, Table 2.19-1, Revision 10, design commitments and ITAAC for the physical security system to be used as the Fermi 3.

The below listed PS-ITAAC reference numbers are from NUREG-0800, SRP Section 14.3.12 Physical Security Hardware - Appendix "A" and are used to provide clarification of the ITAAC related to “Systems, Hardware, or Features Facilitating Security Response and Neutralization.”

PS-ITAAC 5 Illumination Requirements:

Isolation zones and exterior areas within the protected area will be provided with illumination to permit assessment in the isolation zones and observation of activities within exterior areas of the protected area.

PS-ITAAC 7 Vehicle Control Measures Requirements:

The vehicle barrier system will be designed, installed, and located at the necessary standoff distance to protect against the design-basis threat vehicle bombs.

PS-ITAAC 10 Vehicle Areas Access Control Requirements:

Unoccupied vital areas will be designed with locking devices and intrusion detection devices that annunciate in the Secondary Alarm Station.

PS-ITAAC 11 Alarm Station:

a. Intrusion detection equipment and video assessment equipment will annunciate and be displayed concurrently in at least two continuously manned onsite alarm stations (Central and Secondary Alarm Stations).

b. The Secondary Alarm Station will be located inside the protected area and will be designed so that the interior of the alarm station is not visible from the perimeter of the protected area.

c. Central and Secondary Alarm Stations will be designed, equipped and constructed such that no single act, in accordance with the design-basis threat of radiological sabotage, can simultaneously remove the ability of both the central and secondary alarm stations to (1) detect and assess alarms, (2) initiate and coordinate an adequate response to alarms, (3) summon offsite assistance, and (4) provide effective command and control.

d. Both the Central and Secondary Alarm Stations will be constructed, located, protected, and equipped to the standards for the Central Alarm Station (alarm stations need not be identical in design but shall be equal and redundant, capable of performing all functions required of alarm stations).

e. ITAAC 11(new). In May 2010, SRP Section 14.3.12 was revised during the review of this application; an additional PS-ITAAC task was added to this section. This new task is addressed by the applicant in Section 15 of the Fermi 3 PSP. The ITAAC SRP dated January 2010, that was used for review is published in the Federal Register. The initial (2007) SRP on date of application meets the requirements under 10 CFR 50.34(h)

PS-ITAAC 12 Secondary Power Supplies for Alarm Annunciation and Communication Equipment Requirements:

The secondary security power supply system for alarm annunciator equipment contained in the Secondary Alarm Station and non-portable communications equipment contained in the Secondary Alarm Station is located within a vital area.

PS-ITAAC 13 Intrusion Detection Systems Console Display:

a. Security alarm devices, including transmission lines to annunciators, will be tamper indicating and self-checking (e.g., an automatic indication is provided when failure of the alarm system or a component occurs or when on standby power), and alarm annunciation indicates the type of alarm (e.g., intrusion alarms, emergency exit alarm) and location.

b. Intrusion detection and assessment systems will be designed to provide visual display and audible annunciation of alarms in the Secondary Alarm Station.

PS-ITAAC 14 Intrusion Detection Systems Recording Requirements:

Intrusion detection systems recording equipment will record onsite security alarm annunciation including the location of the alarm, false alarm, alarm check, and tamper indication and the type of alarm, location, alarm circuit, date, and time.

PS-ITAAC 15 Vital Area Emergency Exits Requirements:

Emergency exits through the protected area perimeter and vital area boundaries will be alarmed with intrusion detection devices and secured by locking devices that allow prompt egress during an emergency.

PS-ITAAC 16 Communication:

a. The Secondary Alarm Station will have conventional (land line) telephone service with the Main Control Room and local law enforcement authorities.

b. The Secondary Alarm Station will be capable of continuous communication with on-duty security force personnel.

c. Non-portable communications equipment in the Secondary Alarm Station will remain operable from an independent power source in the event of loss of normal power.

Accordingly, the NRC staff determined that the Fermi 3 COL application, Part 10, Table 2.2.1-1 has adequately addressed, PS-ITAAC for Systems, Hardware, or Features Facilitating Security Response and Neutralization Items 5, 7, 10 11(a), 11(b), 11(c), 11(d), (Note: 10 CFR 50.34(h), SRP Section 14.3.12 was revised during the review of this application, and an additional PS-ITAAC task was added to this section. This new task is addressed by the applicant in Section 15 of the Fermi 3 PSP), 12, 13(a), 13(b), 15, 16(a), 16(b), 16(c), identified in Appendix A to Section 14.3.12 of NUREG-0800.

The Fermi 3 COL application, Part 10, Table 2.2.1-1 partially addressed PS-ITAAC Items 10, 11(b), 12, 13(a), 13(b), 14, 15, 16(a), 16(b), 16(c). The application references the ESBWR DCD, which also partially addressed PS-ITAAC Items 10, 11(b), 12, 13(a), 13(b), 14, 15, 16(a), 16(b), 16(c). The NRC staff determined that between both the Fermi 3 COL and the ESBWR DCD all elements of the PS-ITAAC Items 10, 11(b), 12, 13(a), 13(b) 14, 15, 16(a), 16(b), 16(c) are adequately addressed as identified in Appendix A to Section 14.3.12 of NUREG-0800.

The staff has determined that Systems, Hardware, or Features Facilitating Security Response and Neutralization PS-ITAAC described in NUREG-0800, Section 14.3.12 has been fully addressed between the Fermi 3 submission and the ESBWR DCD.

License Condition

- Part 10, License Condition

The staff has reviewed the license condition below against the recommendations in SECY-05-0197 as endorsed by the related SRM, dated February 22, 2006. The staff concluded that the proposed license condition conforms to the guidance in SECY-05-0197. In February 2013, DTE submitted a revised FSAR Table 13.4-201 and Part 10, of their COL application, which confirms the addition of the Operational Program Readiness milestone requirements for Physical Security.

In addition the staff proposes the following License Condition for ITAAC for Physical Security:

Operational Program Readiness

> The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first. This schedule shall also address:
>
> a. The implementation of site specific Severe Accident Management Guidance.
> b. The spent fuel rack coupon monitoring program implementation.

The licensee shall perform and satisfy the ITAAC defined in FSAR Table 2.2.1-1, "ITAAC for the Site-Specific Physical Security," as shown in Attachment 1 of the SER.

13.6A.5 Post Combined License Activities

License Condition 13.6A-1: The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the operational programs in the FSAR table have been fully implemented. This schedule shall also address:

> a. The implementation of site specific Severe Accident Management Guidance.
> b. The spent fuel rack coupon monitoring program implementation.

The licensee shall perform and satisfy the ITAAC defined in FSAR Table 2.2.1-1, "ITAAC for the Site-Specific Physical Security," as shown in Attachment 1 of this SER.

13.6A.6 Conclusions

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. The NRC staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant addressed the required information relating to PS-ITAAC, and there is no outstanding information expected to be addressed in the Detroit Edison COL FSAR related

to this section. The results of the NRC staff's technical evaluation of the information incorporated by reference in the Fermi 3 COL application are documented in NUREG-1966.

The NRC staff concludes that the relevant information presented in the Fermi 3 COL FSAR and the additional information received in the letter dated May 3, 2010, is acceptable based on the applicable regulations specified in Section 13.6A.4.3 of this SER. The staff based its conclusion on the following:

> STD COL 14.3-2-A, as related to PS-ITAAC is acceptable based on the following discussion. The NRC staff finds that the applicant adequately describes the physical security systems or provides and/or facilitates the implementation of the site-specific protective strategy and security programs as documented in Section 13.6 of this SER. The applicant adequately describes the site-specific PS-ITAAC for meeting the requirements of 10 CFR 73.55 and provides the technical bases for establishing a PS-ITAAC for the protection against acts of radiological sabotage and theft of special nuclear material. The applicant includes systems and features as stated in Fermi 3 COL FSAR, Chapter 13.6 which includes referenced TRs. The applicant has provided adequate descriptions of objectives, prerequisites, test methods, data required, and acceptance criteria for security-related ITAAC for the approval of the Fermi 3 COL.

Attachment 1: FSAR Table 2.2.1-1, "ITAAC for the Site-Specific Physical Security"

Table 2.2.1-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
1(a). Vital equipment will be located only within a vital area.	1(a). All vital equipment locations will be inspected.	1(a). Vital equipment is located only within a vital area.
1(b). Access to vital equipment will require passage through at least two physical barriers.	1(b). All vital equipment physical barriers will be inspected.	1(b). Vital equipment is located within a protected area such that access to the vital equipment requires passage through at least two physical barriers.
2(a). Physical barriers for the protected area perimeter will not be part of vital area barriers.	2(a). The protected area perimeter barriers will be inspected.	2(a). Physical barriers at the perimeter of the protected area are separated from any other barrier designated as a vital area barrier.
2(b). Penetrations through the protected area barrier will be secured and monitored.	2(b). All penetrations through the protected area barrier will be inspected.	2(b). All penetrations and openings through the protected area barrier are secured and monitored by intrusion detection equipment.
2(c). Unattended openings that intersect a security boundary, such as underground pathways, will be protected by a physical barrier and monitored by intrusion detection equipment or provided surveillance at a frequency sufficient to detect exploitation.	2(c). All unattended openings within the protected area barriers will be inspected.	2(c). All unattended openings (such as underground pathways) that intersect a security boundary (such as the protected area barrier), are protected by a physical barrier and monitored by intrusion detection equipment or provided surveillance at a frequency sufficient to detect exploitation.
3(a). Isolation zones will exist in outdoor areas adjacent to the physical barrier at the perimeter of the protected area and will be designed of sufficient size to permit observation and assessment on either side of the barrier.	3(a). The isolation zones in outdoor areas adjacent to the protected area perimeter barrier will be inspected.	3(a). The isolation zones exist in outdoor areas adjacent to the physical barrier at the perimeter of the protected area and are of sufficient size to permit observation and assessment of activities on either side of the barrier in the event of its penetration or attempted penetration.

Table 2.2.1-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
3(b). Isolation zones will be monitored with intrusion detection and assessment equipment that is designed to provide detection and assessment of activities within the isolation zone.	3(b). The intrusion detection equipment within the isolation zones will be inspected.	3(b). Isolation zones are equipped with intrusion detection and assessment equipment capable of providing detection and assessment of activities within the isolation zone.
3(c). Areas where permanent buildings do not allow sufficient observation distance between the intrusion detection system and the protected area barrier (e.g., the building walls are immediately adjacent to, or are an integral part of the protected area barrier) will be monitored with intrusion detection and assessment equipment that is designed to detect the attempted or actual penetration of the protected area perimeter barrier before completed penetration of the barrier and assessment of detected activities.	3(c). Inspections of areas of the protected area perimeter barrier that do not have isolation zones will be performed.	3(c). Areas where permanent buildings do not allow sufficient observation distance between the intrusion detection system and the protected area barrier (e.g., the building walls are immediately adjacent to, or an integral part of, the protected area barrier) are monitored with intrusion detection and assessment equipment that detects attempted or actual penetration of the protected area perimeter barrier before completed penetration of the barrier and assessment of detected activities.
4(a). The perimeter intrusion detection system will be designed to detect penetration or attempted penetration of the protected area perimeter barrier before completed penetration of the barrier, and for subsequent alarms to annunciate concurrently in at least two continuously manned onsite alarm stations (central and secondary alarm stations).	4(a). Tests, inspections, or a combination of tests and inspections of the intrusion detection system will be performed.	4(a). The intrusion detection system can detect penetration or attempted penetration of the protected area perimeter barrier before completed penetration of the barrier, and subsequent alarms annunciate concurrently in at least two continuously manned on site alarms stations (central and secondary alarm stations).
4(b). The perimeter assessment equipment will be designed to provide video image recording with real-time and playback capability that can provide assessment of detected activities before and after each alarm annunciation at the protected area perimeter barrier.	4(b). Tests, inspections, or a combination of tests and inspections of the video assessment equipment will be performed.	4(b). The perimeter assessment equipment is capable of real-time and playback video image recording that provides assessment of detected activities before and after each alarm at the protected area perimeter barrier.

Table 2.2.1-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
4(c). The intrusion detection and assessment equipment at the protected area perimeter will be designed to remain operable from an uninterruptible power supply in the event of the loss of normal power.	4(c). Tests, inspections, or a combination of tests and inspections of the uninterruptible power supply will be performed.	4(c). All Intrusion detection and assessment equipment at the protected area perimeter remains operable from an uninterruptible power supply in the event of the loss of normal power.
5. Isolation zones and exterior areas within the protected area will be provided with illumination to permit assessment in the isolation zones and observation of activities within exterior areas of the protected area.	5. The illumination in isolation zones and exterior areas within the protected area will be inspected.	5. Illumination in isolation zones and exterior areas within the protected area is 0.2 foot candles measured horizontally at ground level or alternatively augmented, sufficient to permit assessment and observation.
6. The external walls, doors, ceiling, and floors in the Secondary Alarm Station, and the last access control function for access to the protected area will be bullet resistant, to at least Underwriters Laboratories Ballistic Standard 752, “The Standard of Safety for Bullet-Resisting Equipment,” Level 4, or National Institute of Justice Standard 0108.01, “Ballistic Resistant Protective Materials,” Type III.	6. Type test, analysis, or a combination of type test and analysis of the external walls, doors, ceiling, and floors in the Secondary Alarm Station, and the last access control function for access to the protected area will be performed.	6. A report exists and concludes that the walls, doors, ceilings, and floors in the Secondary Alarm Station, and the last access control function for access to the protected area are bullet resistant to at least Underwriters Laboratories Ballistic Standard 752, Level 4, or National Institute of Justice Standard 0108.01, Type III.
7. The vehicle barrier system will be designed, installed, and located at the necessary standoff distance to protect against the design-basis threat vehicle bombs.	7. Type test, inspections, analysis or a combination of type tests, inspections, and analysis will be performed for the vehicle barrier system	7. A report exists and concludes that the vehicle barrier system will protect against the threat vehicle bombs based on the standoff distance for the system.
8(a). Access control points will be established and designed to control personnel and vehicle access into the protected area.	8(a). Tests, inspections, or a combination of tests and inspections of installed systems and equipment will be performed.	8(a). Access control points exist for the protected area and are configured to control access.

Table 2.2.1-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
8(b). Access control points will be established and designed with equipment for the detection of firearms, explosives, and incendiary devices at the protected area personnel access points.	8(b). Tests, inspections, or a combination of tests and inspections of installed systems and equipment will be performed.	8(b). Detection equipment exists and is capable of detecting firearms, explosives, and incendiary devices at the protected area personnel access control points.
9. An access control system with a numbered photo identification badge system will be installed and designed for use by individuals who are authorized access to protected areas and vital areas without escort.	9. The access control system and the numbered photo identification badge system will be tested.	9. The access authorization system with a numbered photo identification badge system is installed and provides authorized access to protected and vital areas only to those individuals with unescorted access authorization.
10. Unoccupied vital areas will be designed with locking devices and intrusion detection devices that annunciate in the Secondary Alarm Station.	10. Tests, inspections, or a combination of tests and inspections of unoccupied vital area intrusion detection equipment and locking devices will be performed.	10. Unoccupied vital areas are locked, and intrusion is detected and annunciated in the Secondary Alarm Station.
11(a). Intrusion detection equipment and video assessment equipment will annunciate and be displayed concurrently in at least two continuously manned onsite alarm stations (Central and Secondary Alarm Stations).	11(a). Tests, inspections, or a combination of tests and inspections of intrusion detection equipment and video assessment equipment will be performed.	11(a). Intrusion detection equipment and video assessment equipment annunciate and display concurrently in at least two continuously manned onsite alarm stations (Central and Secondary Alarm Stations).
11(b). The Secondary Alarm Station will be located inside the protected area and will be designed so that the interior of the alarm station is not visible from the perimeter of the protected area.	11(b). The Secondary Alarm Station location will be inspected.	11(b). The Secondary Alarm Station is located inside the protected area, and the interior of the alarm station is not visible from the perimeter of the protected area.

Table 2.2.1-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
11(c). Central and Secondary Alarm Stations will be designed, equipped and constructed such that no single act, in accordance with the design-basis threat of radiological sabotage, can simultaneously remove the ability of both the central and secondary alarm stations to (1) detect and assess alarms, (2) initiate and coordinate an adequate response to alarms, (3) summon offsite assistance, and (4) provide effective command and control.	11(c). Tests, inspections, or a combination of tests and inspections of the Central and Secondary Alarm Stations will be performed.	11(c). Central and Secondary Alarm Stations are designed, equipped, and constructed such that no single act, in accordance with the design-basis threat of radiological sabotage, can simultaneously remove the ability of both the central and secondary alarm stations to (1) detect and assess alarms, (2) initiate and coordinate an adequate response to alarms, (3) summon offsite assistance, and (4) provide effective command and control.
11(d). Both the Central and Secondary Alarm Stations will be constructed, located, protected, and equipped to the standards for the Central Alarm Station (alarm stations need not be identical in design but shall be equal and redundant, capable of performing all functions required of alarm stations).	11(d). Tests, inspections, or a combination of tests and inspections of the Central and Secondary Alarm Stations will be performed.	11(d). The Central and Secondary Alarm Stations are located, constructed, protected, and equipped to the standards of the Central Alarm Station and are functionally redundant (stations need not be identical in design).
12. The secondary security power supply system for alarm annunciator equipment contained in the Secondary Alarm Station and non-portable communications equipment contained in the Secondary Alarm Station is located within a vital area.	12. The secondary security power supply system will be inspected.	12. The secondary security power supply system for alarm annunciator equipment contained in the Secondary Alarm Station and non-portable communications equipment contained in the Secondary Alarm Station is located within a vital area.

Table 2.2.1-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
13(a). Security alarm devices, including transmission lines to annunciators, will be tamper-indicating and self-checking (e.g., an automatic indication is provided when failure of the alarm system or a component occurs or when on standby power), and alarm annunciation indicates the type of alarm (e.g., intrusion alarms, emergency exit alarm) and location.	13(a). All security alarm devices and transmission lines will be tested.	13(a). Security alarm devices including transmission lines to annunciators are tamper indicating and self-checking (e.g., an automatic indication is provided when failure of the alarm system or a component occurs, or when the system is on standby power), and the alarm annunciation indicates the type of alarm (e.g., intrusion alarm, emergency exit alarm) and location.
13(b). Intrusion detection and assessment systems will be designed to provide visual display and audible annunciation of alarms in the Secondary Alarm Station.	13(b). Intrusion detection and assessment systems will be tested.	13(b). The intrusion detection and assessment systems provide a visual display and audible annunciation of alarms in the Secondary Alarm Station (concurrently with the display and annunciation in the Central Alarm Station).
14. No Site-Specific ITAAC specified.	14. No Site-Specific ITAAC specified.	14. No Site-Specific ITAAC specified.
15. Emergency exits through the protected area perimeter and vital area boundaries will be alarmed with intrusion detection devices and secured by locking devices that allow prompt egress during an emergency.	15. Tests, inspections, or a combination of tests and inspections of emergency exits through the protected area perimeter and vital area boundaries will be performed.	15. Emergency exits through the protected area perimeter and vital area boundaries are alarmed with intrusion detection devices and secured by locking devices that allow prompt egress during an emergency.
16(a). The Secondary Alarm Station will have conventional (land line) telephone service with the Main Control Room and local law enforcement authorities.	16(a). Tests, inspections, or a combination of tests and inspections of the Secondary Alarm Stations' conventional (land line) telephone service will be performed.	16(a). The Secondary Alarm Station is equipped with conventional (land line) telephone service with the Main Control Room and local law enforcement authorities.

Table 2.2.1-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
16(a). The Secondary Alarm Station is equipped with conventional (land line) telephone service with the Main Control Room and local law enforcement authorities.	16(b). Tests, inspections, or a combination of tests and inspections of the Secondary Alarm Stations' continuous communication capabilities will be performed.	16(b). The Secondary Alarm Station is capable of continuous communication with on-duty watchmen, armed security officers, armed responders, or other security personnel who have responsibilities within the physical protection program and during contingency response events.
16(c). Non-portable communications equipment in the Secondary Alarm Station will remain operable from an independent power source in the event of loss of normal power.	16(c). Tests, inspections, or a combination of tests and inspections of the non-portable communications equipment will be performed.	l6(c). All non-portable communication devices (including conventional telephone systems) in the Secondary Alarm Station are wired to an independent power supply that enables those systems to remain operable (without disruption) during the loss of normal power.

13.7 Fitness for Duty

13.7.1 Introduction

Pursuant to 10 CFR 52.79(a)(44), COL applications must include a description of the FFD Program required by 10 CFR Part 26. The FFD Program is designed to provide reasonable assurance that (1) individuals are trustworthy and reliable as demonstrated by the avoidance of substance abuse; (2) individuals are not under the influence of any substance, legal or illegal, or mentally or physically impaired from any cause that in any way adversely affects their ability to safely and competently perform their duties; (3) measures will be established and implemented for the early detection of individuals who are not fit to perform their duties; (4) the construction site is free from the presence and effects of illegal drugs and alcohol; (5) the work places are free from the presence and effects of illegal drugs and alcohol; and, (6) the effects of fatigue and degraded alertness on an individual's ability to safely and competently perform their duties will be managed commensurate with maintaining public health and safety.

13.7.2 Summary of Application

This section of the FSAR, Revision 7, describes the Fermi 3 FFD Program for the construction and operating phases.

Supplemental Information

- STD SUP 13.7-1 Fitness for Duty

The FFD Program will be implemented and maintained in multiple and progressive phases dependent on the activities, duties, or access afforded to certain individuals at the construction site. In general, two different FFD Programs will be implemented: a construction phase FFD Program and an operating phase FFD Program. The construction and operating phase programs will be implemented as described in Table 13.4-201.

The construction phase of the FFD Program is consistent with NEI 06-06, Revision 5, "Fitness for Duty Program Guidance for New Nuclear Power Plant Construction Sites." NEI 06-06 applies to persons constructing or directing the construction of safety- and security-related structures, systems, or components performed onsite where the new reactor will be installed and operated. Management and oversight personnel—as described in NEI 06-06 with additional details—and security personnel before the receipt of special nuclear material in the form of fuel assemblies (with certain exceptions) will be subject to the operating phase FFD Program that meets the requirements of 10 CFR Part 26, Subparts A through H, N, and O. Following the receipt of special nuclear material onsite in the form of fuel assemblies, security personnel—as described in 10 CFR 26.4(a)(5)—will meet the requirements of an operating phase FFD Program.

The applicant identifies the following commitment:

> Prior to the issuance of a Combined License for Fermi 3, Detroit Edison will review and revise, as necessary, the Fermi 3 construction phase FFD program, should substantial revisions occur to either NEI 06-06 following NRC endorsement, or to the requirements of 10 CFR Part 26, [COM 13.7-001].

License Conditions

There are no license conditions applicable to the Fermi 3 COL application.

13.7.3 Regulatory Basis

The applicable regulatory requirements for Section 13.7 are as follows:

- 10 CFR Part 26
- 10 CFR 52.79(a)(44)

Regulatory guidance for the FFD Programs is included in RG 1.206.

Pending the issuance of an NRC RG for NEI 06–06, applicants may cite NEI 06-06, Revision 5 as a reference in the development of site-specific applications.

13.7.4 Technical Evaluation

The staff reviewed the following information in the COL FSAR:

Supplemental Information

- STD SUP 13.7-1 Fitness for Duty

The applicant provides the new Section 13.7 in the response to RAIs 13.07-1 through 13.07-4 in a letter dated December 16, 2010 (ADAMS Accession No. ML103540126). The staff reviewed the new Section 13.7 and focused on the following areas:

(1) The adequacy of the FFD Program for the construction phase.

(2) The adequacy of the FFD Program for the operations phase.

(3) The implementation schedule proposed by the applicant for both the construction phase and the operations phase FFD programs.

In RAI 13.07-1, the staff asked the applicant:

> Under 10 CFR 52.79(a)(44), the Applicant's FSAR must contain a description of the fitness for duty (FFD) program required by 10 CFR Part 26 and its implementation. How does the Applicant intend to update its FFD program for the construction phase? NEI 06-06 provides examples of FFD programs and, if this guidance is endorsed by the NRC, will provide an acceptable method of complying with the NRC's regulations. If the NRC endorses NEI 06-06, does the Applicant intend to update its FFD program for the construction phase to comply with NEI 06-06? If future revisions to NEI 06-06 are endorsed by the NRC, does the Applicant intend to update its FFD program for the construction phase to comply with certain clarifications, additions, and exceptions in these future, endorsed revisions, as necessary?

The applicant's response dated December 16, 2010 (ADAMS Accession No. ML103540126), states the following:

> Detroit Edison will implement a construction phase Fitness for Duty (FFD) program that follows the guidance in the NRC-endorsed revision of NEI 06-06. The Fermi 3 FSAR, Section 13.7 does not commit to a specific revision of NEI 06-06, but it will be updated to commit to Revision 5 of NEI 06-06. Detroit Edison will evaluate changes in subsequent revisions of NEI 06-06 and will modify the construction phase FFD program to incorporate substantial changes determined to be appropriate.

The applicant proposes to modify COL FSAR Table 1.6-201 and Section 13.7, as described above. An attachment to the RAI responses dated December 16, 2010 (ADAMS Accession No. ML103540126), provides adequate details in Table 1.6-201 of how Detroit Edison will implement NEI 06-06. This attachment provides a sufficient level of detail that addresses all of the milestones established by 10 CFR 26.3 and 26.4. The attachment lists FFD Program elements such as the title, source, section, milestone, and requirements listed in COL FSAR Table 13.4-201. The attachment also provides new text for COL FSAR Section 13.7 that contains a thorough program description and site-specific information. The staff found this response acceptable because it meets the requirements of 10 CFR Part 26 that are set forth in

10 CFR 52.79(a)(44). The staff verified that FSAR Revision 7 includes the applicant's proposed changes. Therefore, RAI 13.07-1 is closed.

In Section 3.7, the applicant identifies Commitment (COM 13.7-001), which states the following:

> Prior to the issuance of a Combined License for Fermi 3, Detroit Edison will review and revise, as necessary, the Fermi 3 construction phase FFD program, should substantial revisions occur to either NEI 06-06 following NRC endorsement, or to the requirements of 10 CFR Part 26.

In RAI 13.07-2, the staff asked the applicant the following:

> Under 10 CFR 52.79(a)(44), the Applicant's FSAR must contain a description of the fitness for duty (FFD) Program required by 10 CFR Part 26 and its implementation. Describe how the COL application, FSAR, Part 2, Table 13.4-201, and (Sheet 13-43) comport with 10 CFR 26 Sections 26.3 and 26.4 and guidance in the NRC letter to the NEI dated December 2, 2009,"Status of U.S. Nuclear Regulatory Commission Review and Endorsement of NEI 06-06, 'Fitness for Duty Program Guidance for New Nuclear Power Plant Construction Sites'." In particular, provide site-specific information to clearly and sufficiently describe your operational FFD Program, in terms of the scope and level of detail to allow a reasonable assurance of a finding of acceptability. For example, will Fermi 3 base its Sections 26.4(a) and (b) FFD Program for Behavioral Observation Program and drug and alcohol testing on an operational unit program or develop its own specific program? Please describe substantial differences, if any.

The applicant's response to this RAI dated December 16, 2010 (ADAMS Accession No. ML103540126), states the following:

> The guidance contained in the NRC's letter to the NEI dated December 2, 2009, was reviewed. Information will be incorporated into Table 13.4-201 and Section 13.7 of the Fermi 3 FSAR consistent with the guidance.

The applicant's proposed revision of the FSAR markup is included in the response to RAI 13.07-1. The staff found that the response provides a sufficient level of detail and addresses all of the milestones established by 10 CFR 26.3 and 26.4.

The staff verified that the applicant has included the proposed changes in FSAR Revision 7. Therefore, RAI 13.07-2 is closed.

In RAI 13.07-3, the staff asked the applicant the following:

> Under 10 CFR 52.79(a)(44), the Applicant's FSAR must contain a description of the fitness for duty (FFD) Program required by 10 CFR Part 26 and its implementation. In the COL application, FSAR, Part 2, under Supplemental Information STD SUP 13.7-1, the applicant states that the operations phase FFD Program is consistent with NEI 03-01. Considering the recent amendment to 10 CFR Part 26, published on March 31, 2008, does the Applicant still intend to reference NEI 03-01 for the operations FFD program, instead of 10 CFR Part 26, which the Applicant referenced in the FSAR, Part 2, Table 13.4-201?

The applicant's response to RAI 13.07-3 dated December 16, 2010 (ADAMS Accession No. ML103350126), states that the basis for the Fermi 3 FFD Program is in 10 CFR Part 26, and the reference to NEI 03-01 will be removed from Section 13.7 of the Fermi 3 COL FSAR. The applicant's proposed COL revision is included in the response to RAI 13.07-1. The staff finds that the response to RAI 13.07-3 provides a sufficient level of detail and addresses all of the milestones established by 10 CFR 26.3 and 26.4. The staff verified that the applicant has included the proposed changes in FSAR Revision 7. Therefore, this RAI 13.07-3 is closed.

In RAI 13.07-4, the staff asked the applicant the following:

> Under 10 CFR 52.79(a)(44), the Applicant's FSAR must contain a description of the fitness for duty (FFD) Program required by 10 CFR Part 26 and its implementation. Describe why the licensee is proposing license conditions for FFD when Part 26 provides explicit implementation requirements.

The applicant's response to RAI 13.07-4, dated December 16, 2010 (ADAMS Accession No. ML103350126), states that the basis for the Fermi 3 FFD Program is in 10 CFR Part 26, and the reference to a license condition will be removed from FSAR Table 13.4-201. The FSAR markup is included in the response to RAI 13.07-1. The staff finds that the response to RAI 13.07-4 provides a sufficient level of detail and addresses all of the milestones established by 10 CFR 26.3 and 26.4. The staff verified that the applicant has included the proposed changes in FSAR Revision 7. Therefore, this RAI 13.07-4 is closed.

13.7.5 Post Combined License Activities

The applicant identifies the following commitment:

- Commitment (COM 13.7-001) – Prior to the issuance of a Combined License for Fermi 3, Detroit Edison will review and revise, as necessary, the Fermi 3 construction phase FFD Program should substantial revisions occur to either NEI 06-06 following the NRC endorsement or to the requirements of 10 CFR Part 26.

13.7.6 Conclusion

NRC staff reviewed FSAR Section 13.7 and the applicant's proposed revision to this section. The staff's review confirmed that the applicant has addressed the required information relating to the FFD Program, and no outstanding information is expected to be addressed in the COL FSAR related to this section.

The staff compared the information in the proposed FSAR markup changes to the relevant NRC regulations and the guidance in NEI 06-06. The staff concludes that the information in the Fermi 3 COL FSAR is acceptable because it meets the regulatory requirements in 10 CFR Part 26 and 10 CFR 52.79(a)(44). The staff based this conclusion on the following:

STD SUP 13.7-1, which relates to the FFD Program, is acceptable because it conforms to 10 CFR Part 26 and 10 CFR 52.79(a)(44), as clarified in the NRC letter to NEI dated December 2, 2009 (ADAMS Accession No. ML092881085).

13.8 Cyber Security

13.8.1 Introduction

This FSAR, Revision 7, section provides information relating to the preparations and plans for the Cyber Security Program for Fermi 3. The purpose of this section is to demonstrate that the COL applicant will establish and maintain a Cyber Security Program to provide high assurance that digital systems, networks, and communication systems are protected from cyber attacks.

13.8.2 Summary of Application

In a letter to the NRC dated June 25, 2010, (ADAMS Accession No. ML101810387) Detroit Edison submitted a Revision 1 of the Cyber Security Plan (CSP) for Fermi 3. The CSP applies to all critical digital assets (CDAs) required for Fermi 3 operations. In the submittal, Detroit Edison describes how it will establish, implement, and maintain a Cyber Security Program that protects digital computer and communication systems and networks associated with safety-related and important-to-safety functions; security functions; and emergency preparedness functions including offsite communications and support systems and equipment which, if compromised, would adversely impact safety, security, or emergency preparedness functions.

The staff issued an RAI requesting the applicant to address the staff's concerns with the CSP that the applicant did not provide a glossary in the CSP. In the responses to RAI 13.06.06-1 dated September 21, 2010 (ADAMS Accession No. ML102660141), the applicant clarified that the intent is to incorporate the NEI 08-09, Revision 6, Appendix B "Glossary" by including a reference with one deviation. The deviation from NEI 08-09, Revision 6, "Cyber Security Plan Template," Appendix B, "Glossary," was identified in the transmittal letter for Revision 1 of the Fermi 3 CSP dated June 25, 2010, (ADAMS Accession No. ML101810387) and was related to the definition of "Cyber Attack." NRC accepted the revised "Cyber Attack" definition in a letter from NRC to NEI dated June 7, 2010 (ADAMS Accession No. ML101550052).

13.8.3 Regulatory Basis

The following NRC regulations include the relevant requirements for the CSP:

- 10 CFR 73.54, "Protection of Digital Computer and Communication Systems and Networks"
- 10 CFR 73.55(a)(1), 10 CFR 73.55(b)(8), and 10 CFR 73.55(m)
- 10 CFR Part 73, Appendix G

10 CFR 73.54 requires each applicant to build and operate a nuclear power plant under 10 CFR Part 52 to submit a CSP that satisfies the requirements of 10 CFR 73.54 for Commission review and approval.

In a letter to the NEI dated May 5, 2010 (ADAMS Accession No. ML101190371), NRC stated that an applicant may use the template in NEI 08-09, Revision 6 to prepare an acceptable CSP. Detroit Edison submitted a CSP for Fermi 3 that was based on the template in NEI 08-09, Revision 6. The staff reviewed the applicant's CSP against the template in NEI 08-09, Revision 6, which is comparable to RG 5.71, "Cyber Security Programs for Nuclear Facilities."

13.8.4 Technical Evaluation

The staff performed a technical evaluation of the applicant's CSP. The staff's review finds that the applicant's CSP conforms to the guidance in NEI 08-09, Revision 6, which is comparable to RG 5.71 to satisfy the requirements in 10 CFR 73.54. The staff also reviewed the applicant's CSP against the requirements of 10 CFR 73.54 in accordance with the guidance in RG 5.71. The staff's evaluation of each section of the applicant's CSP is discussed below.

13.8.4.1 *Scope and Purpose*

This CSP describes how Fermi 3 will establish a Cyber Security Program that will achieve high assurance that Fermi 3 digital computer and communication systems and networks associated with SS Emergency Plan functions (hereafter defined as CDAs) are adequately protected against cyber attacks up to and including the design-basis threat.

The CSP states:

> Within the scope of NRC's cyber security rule at 10 CFR 73.54, systems or equipment that perform important to safety functions include structures, systems, and components (SSCs) in the balance of plant that could directly or indirectly affect reactivity at a nuclear power plant and could result in an unplanned reactor shutdown or transient. Additionally, these SSCs are under the licensee's control and include electrical distribution equipment out to the first inter-tie with the offsite distribution system.

The following actions are described in the CSP and provide high assurance of the adequate protection of systems associated with the SS Emergency Plan functions from cyber attacks:

- Implementing and documenting the "baseline" security controls described in Regulatory Position C.3.3 of RG 5.71.
- Implementing and documenting a cyber security program to maintain the established cyber security controls through a comprehensive life cycle approach, as described in Section 1.4 of the CSP.

The staff finds that the applicant has established adequate measures to implement and document the Cyber Security Program, including baseline security controls. Based on the review, the staff finds that the CSP adequately establishes the Cyber Security Program, including baseline security controls.

13.8.4.2 *Analyzing Digital Computer Systems and Networks and Applying Cyber Security Controls*

The CSP states that the Cyber Security Program will be established, implemented, and maintained as described in Section 3.1 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.3 of RG 5.71 to:

- analyze digital computer and communications systems and networks
- identify those assets that must be protected against cyber attacks to satisfy 10 CFR 73.54(a)

The applicant's CSP states that the cyber security controls in Appendices D and E of NEI 08-09, Revision 6, which are comparable to Appendices B and C in RG 5.71, will be implemented to protect CDAs from cyber attacks.

Based on the above information, the staff finds that the CSP adequately addresses security controls.

13.8.4.3 *Cyber Security Assessment and Authorization*

The CSP provides information addressing the creation of a formal and documented cyber security assessment and authorization policy. This policy includes details concerning the creation of a formal documented procedure comparable to Section 3.1.1 of NEI 08-09, Revision 6.

The staff finds that the applicant has established adequate measures to define and address the purpose, scope, roles, responsibilities, management commitment, and coordination to facilitate the implementation of the cyber security assessment and authorization policy.

The staff reviewed the CSP and finds that the applicant has adequately established the controls to develop, disseminate, and periodically update the cyber security assessment and authorization policy and implementing procedure.

13.8.4.4 *Cyber Security Assessment Team*

The responsibilities of the Cyber Security Assessment Team (CSAT) include conducting the cyber security assessment, documenting key findings during the assessment, and evaluating assumptions and conclusions about cyber security threats. The submitted CSP outlines the requirements, roles, and responsibilities of the CSAT that are comparable to Section 3.1.2 of NEI 08-09, Revision 6. The CSP also states that the CSAT has the authority to conduct an independent assessment.

The CSP describes that the CSAT will consist of individuals with knowledge about information and digital systems technology; nuclear power plant operations, engineering, and plant technical specifications; and physical security and emergency preparedness systems and programs. The CSAT description in the CSP is comparable to Regulatory Position C.3.1.2 of RG 5.71.

The CSP lists the roles of and responsibilities for the CSAT that include performing and overseeing the cyber security assessment process; documenting key observations; evaluating information about cyber security threats and vulnerabilities; confirming information obtained during tabletop reviews, walk-downs, or electronic validation of CDAs; and identifying potential new cyber security controls.

Based on the above description, the staff finds that the CSP adequately establishes the requirements, roles, and responsibilities of the CSAT.

13.8.4.5 *Identification of Critical Digital Assets*

The CSP states that the licensee applicant will identify and document CDAs and critical systems, including a general description; overall functions; overall consequences if a compromise were to occur; and security functional requirements or specifications as described

in Section 3.1.3 of NEI 08-09, Revision 6—which are comparable to those in Regulatory Position C.3.1.3 of RG 5.71.

Based on the above, the staff finds that the CSP adequately describes the process for identifying CDAs.

13.8.4.6 *Examination of Cyber Security Practices*

The CSP describes how the CSAT will examine and document the existing cyber security policies, procedures, and practices; existing cyber security controls; detailed descriptions of network and communication architectures (or network/communication architectural drawings); information on security devices; and any other information that may be helpful during the cyber security assessment process described in Section 3.1.4 of NEI 08-09, Revision 6—which is comparable to Regulatory Position C.3.1.2 of RG 5.71. The examinations will include an analysis of the effectiveness of the existing Cyber Security Program and cyber security controls. The CSAT will document the collected cyber security information and the results of the NRC examination of the collected information.

Based on the above information, the staff finds that the CSP adequately describes the examination of cyber security practices.

13.8.4.7 *Reviews and Validation Testing*

The CSP describes tabletop reviews and validation testing, which confirm the direct and indirect connectivity of each CDA and identify direct and indirect pathways to CDAs. The CSP states that validation testing will be performed electronically or by physical walkdowns. The plan of the licensee for tabletop reviews and validation testing is comparable to Section 3.1.5 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.3.1.4 of RG 5.71.

Based on the above information, the staff finds that the CSP adequately describes tabletop reviews and validation testing.

13.8.4.8 *Mitigation of Vulnerabilities and Application of Cyber Security Controls*

In accordance with Section 3.1.6 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.3.3 and Appendix A.3.1.6 of RG 5.71, the submitted CSP describes the use of information collected from Section 3.1.4 of the CSP to address cyber security controls.

The submitted CSP notes that before Fermi 3 can implement security controls on a CDA, the applicant must assess the potential for an adverse impact per Section 3.1.6 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.3.3 of RG 5.71.

Based on the above information, the staff finds that the CSP adequately describes the capability to mitigate vulnerabilities and apply security controls.

13.8.4.9 *Incorporating the Cyber Security Program into the Physical Protection Program*

The CSP states that the Cyber Security Program will be reviewed as a component of the Physical Security Program, in accordance with the requirements of 10 CFR 73.55(m). This

information is comparable to Section 4.1 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.3.4 of RG 5.71.

Based on the above information, the staff finds that the CSP adequately describes the CSP as a component of the Physical Security Program.

13.8.4.10 *Cyber Security Controls*

The CSP describes how the technical, operational and management cyber security controls in Appendices D and E of NEI 08-09 Revision 6 (which are comparable to Appendices B and C in RG 5.71) are evaluated and dispositioned based on site-specific conditions during all phases of the Cyber Security Program. The CSP states that many security controls have actions that must be performed on specific frequencies, and the frequency of a security control is satisfied if the action is performed within 1.25 times of the frequency specified in the control (as applied) and measured from the previous performance of the action as described in Section 4.2 of NEI 08-09, Revision 6.

Based on the above information, the staff finds that the CSP adequately describes the implementation of cyber security controls.

13.8.4.11 *Defense-in-Depth Protective Strategies*

The CSP describes the implementation of defensive strategies that ensure the capability to detect, respond to, and recover from a cyber attack. The CSP specifies that defensive strategies consist of security controls, defense-in-depth measures, and the defensive architecture. The submitted CSP notes that the defensive architecture establishes the logical and physical boundaries to control the data transfer between these boundaries. The defensive architecture is consistent with the security model in NEI 08-09, Revision 6.

Based on the above review, the staff finds that the “Defense-in-Depth Protective Strategies” described in Section 4.3 of the CSP are acceptable.

13.8.4.12 *Ongoing Monitoring and Assessment*

The CSP describes how the ongoing monitoring of cyber security controls to support CDAs will be implemented comparable to Appendix E of NEI 08-09, Revision 6, which is comparable to Regulatory Positions C.4.1 and C.4.2 of RG 5.71. The ongoing monitoring program includes configuration management and change control; a cyber security impact analysis of changes and changed environments; ongoing assessments of cyber security controls; an effectiveness analysis (to monitor and confirm that the cyber security controls are implemented correctly, operating as intended, and achieving the desired outcome); and vulnerability scans to identify new vulnerabilities that could affect the security posture of CDAs.

Based on the above details, the staff finds that the CSP adequately describes ongoing monitoring and assessment.

13.8.4.13 *Modification of Digital Assets*

The CSP describes how cyber security controls are established, implemented, and maintained to protect CDAs. These security controls ensure that: 1) modifications to CDAs are evaluated

before implementation, 2) cyber security performance objectives are maintained, and 3) acquired CDAs have cyber security requirements in place to achieve the site's Cyber Security Program objectives. These controls are comparable to Section 4.5 of NEI 08-09, Revision 6, which is comparable to Appendices A.4.2.5 and A.4.2.6 of RG 5.71.

Based on the above information, the staff finds that the CSP adequately describes the modification of digital assets.

13.8.4.14 *Attack Mitigation and Incident Response*

The CSP describes the process to ensure that SS Emergency Plan functions are not adversely impacted due to cyber attacks in accordance with Section 4.6 of NEI 08-09, Revision 6, which is comparable to Appendix C, Section C.8 of RG 5.71. The CSP includes a discussion about creating the incident response policy and procedures and addresses training, testing, drills, incident handling, incident monitoring, and incident response assistance. The CSP also describes the identification, detection, response, containment, eradication, and recovery activities comparable to Section 4.6 of NEI 08-09, Revision 6.

Based on the above details, the staff finds that the CSP adequately describes attack mitigation and incident response.

13.8.4.15 *Cyber Security Contingency Plan*

The CSP describes the creation of a Cyber Security Contingency Plan and policy that protects CDAs from the adverse impacts of a cyber attack described in Section 4.7 of NEI 08-09, Revision 6 (which is comparable to Regulatory Position C.3.3.2.7 and Appendix C.9 of RG 5.71). The applicant describes the Cyber Security Contingency Plan that will include the response to events. The plan includes procedures for operating CDAs in a contingency, roles and responsibilities of responders, processes and procedures for the backup and storage of information, logical diagrams of network connectivity, current configuration information, and personnel lists for authorized access to CDAs.

Based on the above information, the staff finds that the CSP adequately describes the cyber security contingency plan.

13.8.4.16 *Cyber Security Training*

The CSP describes a program that establishes the training requirements necessary for the personnel and contractors of the applicant/licensee to perform their assigned duties and responsibilities in implementing the program, in accordance with Section 4.8 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.3.3.2.8 of RG 5.71.

The CSP states that individuals will be trained with a level of cyber security knowledge commensurate with their assigned responsibilities, in order to provide high assurance that individuals will be able to perform their job functions in accordance with Appendix E of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.3.3.2.8 of RG 5.71 and describes three levels of training: awareness training, technical training, and specialized cyber security training.

Based on the above information, the staff finds that the CSP adequately describes cyber security training and awareness requirements.

13.8.4.17 *Evaluate and Manage Cyber Risk*

The CSP describes how the cyber risk is evaluated and managed utilizing site programs and procedures that are comparable to those in Section 4.9 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.4 and Appendix C, Section C.13 of RG 5.71. The CSP describes the Threat and Vulnerability Management Program, Risk Mitigation, Operational Experience Program; and the Corrective Action Program and shows how each will be used to evaluate and manage risk.

Based on the above information, the staff finds that the CSP adequately describes the evaluation and management of cyber risks.

13.8.4.18 *Policies and Procedures*

The CSP describes the development and implementation of policies and procedures that meet security control objectives in accordance with Section 4.10 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.3.5 and Appendix A, Section A.3.3 of RG 5.71. The CSP includes the process to document, review, approve, issue, use, and revise policies and procedures.

The CSP also describes the applicant's procedures to establish specific responsibilities for positions described in Section 4.11 of NEI 08-09, Revision 6, which is comparable to Appendix C, Section C.10.10 of RG 5.71.

Based on the above information, the staff finds that the CSP adequately describes cyber security policies and implementation procedures.

13.8.4.19 *Roles and Responsibilities*

The CSP describes the roles of and responsibilities for the qualified and experienced personnel including the Cyber Security Program Sponsor, the Cyber Security Program Manager, Cyber Security Specialists, the Cyber Security Incident Response Team (CSIRT), and other positions as needed. In accordance with the Incident Response Plan, the CSIRT initiates emergency actions when required to safeguard CDAs from cyber security compromises and to assist with the eventual recovery of compromised systems. The implementing procedures establish roles of and responsibilities for each of the cyber security roles in accordance with Section 4.11 of NEI 08-09 Revision 6, which is comparable to Regulatory Position C.3.1.2, Appendix A, Section A.3.1.2 and Appendix C, Section C.10.10 of RG 5.71.

Based on the above information, the staff finds that the CSP adequately describes cyber security roles and responsibilities.

13.8.4.20 *Security Program Review*

The submitted CSP describes how the Cyber Security Program establishes the necessary procedures to implement reviews of applicable program elements, in accordance with

Section 4.12 of NEI 08-09, Revision 6, which is comparable to Regulatory Position C.4.3 and Appendix A, Section A.4.3 of RG 5.71.

Based on the above information, the staff finds that the CSP adequately describes the Cyber Security Program review.

13.8.4.21 *Document Control and Records Retention and Handling*

The CSP states that the applicant has established the necessary measures and governing procedures to ensure that sufficient records of items and activities affecting cyber security will be developed, reviewed, approved, issued, used, and revised to reflect completed work.

The staff was concerned that the Fermi 3 discussion of records retention did not comply with 10 CFR 73.54(h). The staff issued RAI 13.06.06-1 requesting the applicant to provide clarifications about Fermi 3's records retention. The applicant's response, dated September 21, 2010 (ADAMS Accession No. ML102660141), stated that the CSP will be modified to follow NEI 08-09, Revision 6, which describes cyber security records retention procedures which are appropriate and acceptable to the staff and comply with 10 CFR 73.54(h). The implementation of this response is being tracked as Confirmatory Item 13.6.6-1. The staff verified that FSAR Revision 7 includes retaining records until the Commission terminates the license, in accordance with the requirements of 10 CFR 73.54(h). Therefore, Confirmatory Item 13.6.6-1 is resolved.

Based on the above information, the staff concludes that the CSP adequately describes cyber security document control and records retention and handling.

13.8.4.22 *Implementation Milestone*

FSAR Table 13.4-201 refers to the implementation milestone for the Cyber Security Program and Commitment COM 13.4-032. The milestone is "prior to fuel on-site." The NRC staff's review of the implementation milestone finds that it satisfactory, because it complies with 10 CFR 73.55(a)(4).

Based on the above review, the staff finds that the "Implementation Milestone" described in Table 13.4-201 of Fermi 3 FSAR is acceptable.

13.8.5 Post Combined License Activities

The applicant identifies the following commitment in FSAR Table 13.4-201:

- Commitment (13.5-032) – Develop and implement a CSP prior to fuel on-site (Protected Area).

13.8.6 Conclusion

The staff compared Table 13.4-201 of the FSAR and the Fermi 3 CSP to the relevant NRC regulations and the criteria in RG 5.71 via NEI 08-09, Revision 6. The staff concludes that the applicant is in compliance with NRC regulations.

On the basis of the review, the staff finds that the information in the Fermi 3 CSP adequately addresses the relevant requirements and guidance of 10 CFR 73.54 and RG 5.71, respectively. Therefore, the staff finds the information contained in this section acceptable.

The staff's review confirmed that the applicant has addressed the relevant information to satisfy the requirements of 10 CFR 73.54, 10 CFR 73.55(a)(1), 10 CFR 73.55(b)(8), 10 CFR 73.55(m), and Appendix G to 10 CFR Part 73, as applicable. Thus, the staff concludes that no outstanding information is expected to be addressed in the COL FSAR related to this section.

14.0 INITIAL TEST PROGRAM

This chapter of the combined license (COL) Final Safety Analysis Report (FSAR) addresses information concerning the Initial Test Program (ITP) for structures, systems, and components (SSCs) and design features for both the nuclear portion of the Fermi Unit 3 Station (Fermi 3) and the balance of plant. The information includes major phases of the test program, including preoperational tests, initial fuel loading and initial criticality, low-power tests, and power-ascension tests. The COL applicant thus describes the scope of the ITP as well as general plans for accomplishing the ITP in sufficient detail to demonstrate that there is due consideration given to matters that normally require advance planning.

In accordance with Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," Regulatory Position C.I.14, "Verification Programs," dated June 2007, the COL applicant describes the technical aspects of the ITP in sufficient detail to show that (1) the test program adequately verifies the functional requirements of plant SSCs, and (2) the sequence of testing is such that the safety of the plant does not depend on untested SSCs. The COL applicant also describes measures to ensure that (1) the ITP will be accomplished with adequate numbers of qualified personnel; (2) there will be adequate administrative controls established to govern the ITP; (3) the ITP will be used, to the extent practicable, to train and familiarize the plant's operating and technical staff in the operation of the facility; and (4) the adequacy of plant operating and emergency procedures will be verified, to the extent practicable, during the period of the ITP.

This chapter also provides information on the inspections, tests, analyses, and acceptance criteria (ITAAC) that the applicant proposes to demonstrate that, when the identified ITAAC are performed and the associated acceptance criteria met, the facility will have been constructed and will operate in conformity with (1) the COL; (2) the Atomic Energy Act of 1954, as amended; and (3) the U.S. Nuclear Regulatory Commission (NRC) regulations.

14.1 Initial Test Program for Preliminary Safety Analysis Reports

Section 14.1 of the Fermi 3 Combined License Application (COLA) FSAR, Revision 7, incorporates by reference, with no departures or supplements, Section 14.1, "Initial Test Program for Preliminary Safety Analysis Reports," of Revision 10 of the certified Economic Simplified Boiling-Water Reactor (ESBWR) Design Certification Document (DCD), referenced in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix E. The NRC staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remained for review.[1] The NRC staff's review confirmed that there is no outstanding issue related to this section. Pursuant to 10 CFR 52.63(a)(5) and Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to summary description that were incorporated by reference have been resolved.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

14.2 Initial Plant Test Program for Final Safety Analysis Reports

14.2.1 Introduction

This FSAR section presents an overview of the Fermi 3 ITP.

14.2.2 Summary of Application

Section 14.2, "Initial Plant Test Program for Final Safety Analysis Reports," of the Fermi 3 FSAR, Revision 7, incorporates by reference Section 14.2 of the certified ESBWR DCD, Revision 10.

In addition, the Fermi 3 FSAR, Revision 7, Section 14.2, provides the following:

COL Items

- STD COL 14.2-1-A Description – Initial Test Program Administration

The applicant developed and provided a description of the ITP administration in Appendix 14AA of the Fermi 3 FSAR, Revision 4.

- STD COL 14.2-2-A Startup Administrative Manual

The applicant provided a milestone for completing the Startup Administrative Manual (SAM).

- STD COL 14.2-3-A Test Procedures

The applicant provided milestones for making approved test procedures satisfying the requirements of the ITP.

- STD COL 14.2-4-A Test Program Schedule and Sequence

The applicant provided a license condition to develop and make detailed testing schedules available for NRC review prior to actual implementation. The implementation milestones for the ITP are provided in Section 13.4 of the Fermi 3 FSAR, Revision 4.

- EF3 COL 14.2-5-A Site Specific Preoperational and Startup Tests

The applicant described the site specific preoperational and initial startup tests not addressed in DCD Section 14.2.8.

- EF3 COL 14.2-6-A Site Specific Preoperational and Startup Tests

The applicant specified that site specific testing will be performed and acceptance criteria for each preoperational and startup test are documented in test procedures available 60 days prior to their intended use.

Supplemental Information

- STD SUP 14.2-2 Test Records

The applicant specified that startup test reports are prepared in accordance with RG 1.16, Revision 4, "Reporting of Operating Information – Appendix A Technical Specifications."

- STD SUP 14.2-4 AC Power Distribution System Preoperational Test General Test Methods and Acceptance Criteria

The applicant specified that proper operation of the automatic transfer capability of the normal preferred power source to the alternate preferred power source.

- EF3 SUP 14.2-1 Organization and Staffing

The applicant provided additional information regarding responsibilities, qualifications, and organization for the pre-operational and startup testing program.

- EF3 SUP 14.2-2 Site-Specific Performance Test

The applicant specified that the objective of this test is to demonstrate acceptable performance of the waste heat rejection portion of the circulating water system (CWS or CIRC); i.e., the hyperbolic cooling tower and basin.

- EF3 SUP 14.2-3 Site-Specific Pre-Operational Tests

The applicant specified site-specific pre-operational tests for the Station Water System (SWS) and the Cooling Tower.

- EF3 SUP 14.2-4 Plant Service Water System (PSWS) Preoperational Test

The applicant specified the verification of proper operation of the PSWS.

- EF3 SUP 14.2-5 Plant Service Water System Performance Test

The applicant specified the verification of performance of the PSWS under expected reactor power operation load conditions.

14.2.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966, the Final Safety Evaluation Report (FSER) related to the certified ESBWR DCD. In addition, the relevant requirements of the Commission regulations for the ITP, and the associated acceptance criteria, are in Section 14.2 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," the Standard Review Plan (SRP).

The regulatory basis for acceptance of supplemental information related to operational programs is addressed in the following documents:

- Section 14.2, of NUREG-0800

- Regulatory Position C.I.14, "Verification Programs," of RG 1.206; and

- RG 1.68, "Initial Test Programs for Water-Cooled Nuclear Power Plants"

The regulatory basis for applicant development of administrative controls that will be used to govern the ITP is addressed in SRP Sections 14.2.3.B.ii and iii, and in RG 1.206, Regulatory Position C.I.14. The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing or Production and Utilization Facilities."

14.2.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 14.2 of the certified ESBWR DCD. The staff reviewed Section 14.2 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in the Fermi 3 COL FSAR, Revision 7 and the information in the ESBWR DCD, appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information contained in the application and the information incorporated by reference address the relevant information related to this section.

The Fermi 3 ITP includes a test program that will verify the functional requirements of plant SSCs. The ITP also includes the applicant's plans for the sequence of testing. The staff noted that the sequence of testing is organized in such a manner that the safety of the plant does not depend on any untested SSCs. In addition, the staff noted the following:

- The ITP is to be conducted with an adequate number of qualified personnel.

- Appropriate administrative controls have been established to govern the ITP.

- The test program will be used to train and familiarize the plant's operating and technical staff with general operation of the facility.

- The adequacy of plant operating and emergency procedures will be verified, to the extent practicable, during the ITP performance period.

The NRC staff's technical evaluation of the FSAR sections affected by COL Items STD COL 14.2-1-A, STD COL 14.2-2-A, STD COL 14.2-3-A, STD COL 14.2-4-A, EF3 COL 14.2-5-A, EF3 COL 14.2-6-A and supplemental information items STD SUP 14.2-2, STD SUP 14.2-4, EF3 SUP 14.2-1, EF3 SUP 14.2-2, EF3 SUP 14.2-3, EF3 SUP 14.2-4, and EF3 SUP 14.2-5 is discussed in Subsections 14.2.4.1 through 14.2.4.8.

[1] See "*Finality of Referenced NRC Approvals*," in SER Section 1.2.2, for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

14.2.4.1 *Organization and Staffing*

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

Supplemental Information

- EF3 SUP 14.2-1

In FSAR Section 14.2.1.4, "Organization and Staffing," the applicant added the following:

> Section 13.1 provides additional information regarding responsibilities, qualifications, and organization for implementing the preoperational and startup testing program.

The staff found the administrative addition of a pointer to Section 13.1 of the FSAR, regarding organization and staffing, acceptable.

14.2.4.2 *Startup Administrative Manual*

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

COL Items

- STD COL 14.2-1-A Description – Initial Test Program Administration

The applicant developed and provided a description of the ITP administration in Appendix 14AA of the Fermi 3 FSAR, Revision 4.

Section 14.2.2.1 "Startup Administrative Manual," of the DCD states in part that:

> A description of the initial test program administration is developed and made available to the NRC by the COL Applicant. This includes a discussion and description of the process and organizational controls and requirements that are included in the Startup Administrative Manual. See Subsection 14.2.10, COL Information Item 14.2-1-A.

The applicant developed and provided a description of the ITP administration in Appendix 14AA of the Fermi 3 FSAR, Revision 7. The staff reviewed the appendix and noted that it provided an adequate discussion and description of the process and organizational controls and requirements that are included in the Startup Administrative Manual.

The staff evaluated STD COL 14.2-1-A according to the relevant NRC regulations and acceptance criteria defined in NUREG-0800, Section 14.2 along with the guidance in RG 1.68 and RG 1.206, Section C.I.14, and finds that the applicant has satisfactorily addressed DCD COL Item 14.2-1-A.

- STD COL 14.2-2-A Startup Administrative Manual

Section 14.2.2.1 "Startup Administrative Manual," of the DCD states in part that:

> The COL Applicant will provide a milestone for completing the Startup Administrative Manual and making it available for Nuclear Regulatory Commission (NRC) inspection (COL 14.2-2-A). [Note: The official designation of this manual may differ for the plant

owner/operator referencing the ESBWR design; the term Startup Administrative Manual is used throughout this discussion for illustrative purposes only.]

The applicant replaced the above section with a milestone for developing and providing the startup administrative manual no later than 60 days prior to the intended use for preoperational test and scheduled fuel loading for initial startup tests. In Section 14.2.2.1 of the FSAR, the applicant stated that:

> The Startup Administration Manual will be developed and made available for review 60 days prior to scheduled start of the preoperational test program.

In addition, the applicant identified a license condition for STD COL 14.2-2-A, in Revision 5 of Part 10, Section 3.2.1, included in Revision 7 of the COL application and is also addressed below in Post Combined License Activities. The licensee will track the development of the startup administrative manual in order to address this COL information item in accordance with applicable guidance. The staff evaluated STD COL 14.2-2-A according to the relevant NRC regulations and acceptance criteria defined in NUREG-0800, Section 14.2 along with the guidance in RG 1.68 and RG 1.206, Section C.I.14, and finds that the applicant has satisfactorily addressed DCD COL Item 14.2-2-A.

14.2.4.3 *Test Procedures*

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

COL Item

- STD COL 14.2-3-A Test Procedures

Section 14.2.2.2 “Test Procedures,” of the DCD states in part that:

> The COL Applicant will provide milestones for making available to the NRC approved test procedures satisfying the requirements for the ITP (COL 14.2-3-A).

The applicant replaced the sentence above with a milestone for developing and providing approved test procedures no later than 60 days prior to the intended use for preoperational test and scheduled fuel loading for initial startup tests. In Section 14.2.2.2 of the FSAR, the applicant stated that:

> Approved test procedures for satisfying this section will be developed and available for review no later than 60 days prior to their intended use for preoperational tests and scheduled fuel loading for initial startup tests.

In addition, the applicant identified a license condition for STD COL 14.2-3-A in Part 10, Section 3.2.2 of their application and which is also listed below in Post Combined License Activities. The licensee will track the development of test procedures in order to address this COL information item in accordance with applicable guidance. The staff evaluated STD COL 14.2-3-A according to the relevant NRC regulations and acceptance criteria defined in NUREG-0800, Section 14.2 along with the guidance in RG 1.68 and RG 1.206, Section C.I.14, and finds that the applicant has satisfactorily addressed DCD COL Item 14.2-3-A.

14.2.4.4 *Test Records*

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

Supplemental Information

- STD SUP 14.2-2 Test Records

In FSAR Section 14.2.2.5, "Test Records," the applicant added the following:

> Startup test reports are prepared in accordance with RG 1.16.

The staff determined that the COL applicant's supplemental information STD SUP 14.2-2 regarding the development of startup test reports is acceptable because it meets the regulatory basis in SRP Section 14.2, Item 3.F.v, "Review, Evaluation, and Approval of Test Results."

14.2.4.5 *Test Program Schedule and Sequence*

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

COL Item

- STD COL 14.2-4-A Test Program Schedule and Sequence

The applicant provided a license condition to develop and make detailed testing schedules available for NRC review prior to actual implementation. The implementation milestones for the ITP are provided in Section 13.4 of the Fermi 3 FSAR, Revision 7.

Section 14.2.7 "Test Program Schedule and Sequence," of the DCD states in part that:

> The COL applicant will provide a milestone for completing the detailed testing schedule and making it available to the NRC (COL 14.2-4-A).

In FSAR Section 14.2.7, "Test Program Schedule and Sequence," the applicant noted that a detailed testing schedule will be developed and made available for review prior to actual implementation. The applicant added that the schedule may be updated and continually optimized to reflect actual progress and subsequently revised projections. In Revision 2 to FSAR Section 14.2.7, the COL applicant revised this COL issue to be COL applicant item STD COL 14.2-4-A.

The applicant identified a license condition for STD COL 14.2-4-A, as discussed below in Post Combined License Activities. The license condition is Item 3.6 of Revision 5 of Part 10, "ITAAC," included in Revision 7 of the COL application. The licensee will track the development of the detailed testing schedule in order to address this COL information item in accordance with applicable guidance. The staff evaluated STD COL 14.2-4-A according to the relevant NRC regulations and acceptance criteria defined in NUREG-0800, Section 14.2 along with the guidance in RG 1.68 and RG 1.206, Section C.I.14, and finds that the applicant has satisfactorily addressed DCD COL Item 14.2-4-A.

14.2.4.6 *AC Power Distribution System Preoperational Test General Test Methods and Acceptance Criteria*

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

Supplemental Information

- STD SUP 14.2-4 AC Power Distribution System Preoperational Test General Test Methods and Acceptance Criteria

In the FSAR Section 14.2.8.1.36, "AC Power Distribution System Preoperational Test General Test Methods and Acceptance Criteria," the applicant added the following:

> Proper operation of the automatic transfer capability of the normal preferred power source to the alternate preferred power source.

The staff issued RAI 14.02-1 on March 25, 2009 (Agencywide Document Access and Management System (ADAMS) Accession No. ML090840227), requesting that the applicant address the deletion of the above statement from FSAR Section 14.2.9. In a letter response to RAI 14.02-1, dated April 23, 2009 (ADAMS Accession No. ML091250352), the applicant stated in part that:

> FSAR Section 14.2.8.1.36, AC Power Distribution System Preoperational Test, has been added with a requirement to perform a test demonstrating the capability to transfer power from the normal preferred power supply to the alternate preferred power supply

The staff noted that the test requirement was not deleted but moved from Section 14.2.9.1.4 to FSAR Section 14.2.8.1.36, consistent with the DCD. The COL applicant also added STD SUP 14.2-4 to track supplemental preoperational test information in FSAR Section 14.2.8.1.36. The staff determined that the applicant's RAI response was acceptable. The staff also determined that the supplemental information item adequately addressed the need to verify the proper operation of the automatic transfer capability of the normal preferred power source to the alternate preferred power source. Therefore, the staff determined that STD SUP 14.2-4, which added the site-specific test acceptance criteria, was acceptable.

14.2.4.7 *Plant Service Water System Preoperational Test and Purpose*

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

Supplemental Information

- EF3 SUP 14.2-4 Plant Service Water System Preoperational Test Purpose
- EF3 SUP 14.2-5 Plant Service Water System Performance Test

In the COL FSAR, the applicant added site-specific supplemental information that included details regarding preoperational and performance tests for the Alternate Heat Sink (AHS). Specifically, the applicant included AHS in the descriptions of the test objectives in Section 14.2.8.1.51 "Plant Service Water System Preoperational Test Purpose," and in Section 14.2.8.2.18, "Plant Service Water System Performance Test Purpose," of the FSAR. In addition, the applicant also added the following details and statement regarding AHS testing in FSAR Section 14.2.8.1.51:

- Proper operation of control interlocks and equipment protective devices in AHS fans, motors, and valves;

- Proper operation of the AHS fans, motors, and valves in all design operating modes;

- Automatic transfer between PSWS trains and components in response to Anticipated Operational Occurrences; and

- Proper operation of water hammer mitigating design features.

However, due to insufficient heat loads during preoperational test phase, the heat exchanger and the AHS performance verification is deferred until the startup phase.

The staff noted that the applicant's site-specific supplemental information EF3 SUP 14.2-4 and EF3 SUP 14.2-5 regarding preoperational and performance test for the AHS did not represent a reduction in commitment, and were added in response to RAI 09.02.01-9. The staff's review of the applicant's response to RAI 09.02.01-9 is discussed in the staff SER Section 9.2.1.4. The staff determined that the applicant's supplementary information is acceptable.

14.2.4.8 *Site Specific Preoperational and Startup Tests*

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

COL Items

- EF3 COL 14.2-5-A Site Specific Tests

Section 14.2.9 "Site-Specific Preoperational and Start up Tests," of the DCD states in part that:

> The COL Applicant will define any required site specific preoperational and startup testing. See Subsection 14.2.10 for COL Information item 14.2-5-A. Testing of such systems and components should be adequate to demonstrate conformance to such requirements as defined throughout the specific chapters of the Standard Safety Analysis Report (SSAR). Below are systems that may require such testing:
>
> - Electrical switchyard and equipment;
> - Station Water System;
> - Personnel monitors and radiation survey instruments; and
> - The automatic dispatcher control system (if applicable).

The applicant deleted FSAR Subsection 14.2.9.1.4 and moved preoperational tests for electrical switchyard equipment to FSAR Subsection 14.2.8.1.36. For additional details on preoperational testing of electrical equipment, see FSER Section 14.2.4.6. The applicant added site-specific supplemental information in EF3 SUP 14.2-3 and EF3 SUP 14.2-2 in FSAR Subsection 14.2.9.1.1, "Station Service Water Preoperational Test," and FSAR Subsection 14.2.9.1.2, "Cooling Tower Preoperational Test." The applicant also deleted FSAR Subsections 14.2.9.1.3 since the COL applicant took exception to guidance in RG 1.68, Appendix A, Items 1.k(2) "personnel monitors and radiation survey instruments" and 1.k(3) "laboratory equipment used to analyze or measure radiation levels and radioactivity

concentrations." For additional details on these exceptions, see the evaluation below. The applicant did not address the automatic dispatcher control system testing since it is not applicable to Fermi 3.

In the COL FSAR, the applicant states the following:

> This section describes the site specific preoperational and initial startup tests not addressed in DCD Section 14.2.8.

The applicant identified supplemental information in EF3 SUP 14.2-2 and EF3 SUP 14.2-3 regarding the preoperational and initial startup tests not addressed in DCD Section 14.2.8. EF3 SUP 14.2-3 contains the test abstracts for "Station Water System Pre-Operational Test," and "Cooling Tower Preoperational Test." EF3 SUP 14.2-2 contains the test abstract for "Cooling Tower Performance Test."

The staff noted that, in addition to the individual test descriptions in Sections 14.2.8 of the FSAR, the applicant defined its required site-specific preoperational and startup testing, as noted in EF3 SUP 14.2-2 and EF3 SUP 14.2-3. The staff evaluated EF3 COL 14.2-5-A according to the relevant NRC regulations and acceptance criteria defined in NUREG-0800, Section 14.2 along with the guidance in RG 1.68 and RG 1.206, Section C.I.14, and finds that the applicant satisfactorily addressed DCD COL Item 14.2-5-A.

- EF3 COL 14.2-6-A Specific Testing Test Procedures

Section 14.2.9 of the DCD states in part that:

> If site-specific preoperational or startup tests are identified as necessary, the appropriate procedures will be prepared by the same method and to the same standard as discussed in Subsection 14.2.2.2. The COL Applicant will provide milestones for making available to the NRC approved test procedures satisfying the requirements for the ITP (COL 14.2-6-A).

In the COL FSAR, the applicant states the following:

> Specific testing to be performed and the applicable acceptance criteria for each preoperational and startup test are documented in test procedures to be made available to the NRC approximately 60 days prior to their intended use for preoperational tests, and not less than 60 days prior to scheduled fuel load for initial startup tests. Site-specific preoperational tests are in accordance with the system specifications and associated equipment specifications for equipment in those systems provided by the licensee that are not part of the standard plant described in DCD Section 14.2.8. The tests demonstrate that the installed equipment and systems perform within the limits of these specifications.

The applicant identified a license condition for EF3 COL 14.2-6-A, as discussed below in Post Combined License Activities. The licensee will track the development of test procedures for each preoperational and startup test in order to address this COL information item in accordance with applicable guidance. The staff evaluated STD COL 14.2-6-A according to the relevant NRC regulations and acceptance criteria defined in NUREG-0800, Section 14.2 along with the guidance in RG 1.68 and RG 1.206, Section C.I.14, and finds that the applicant has satisfactorily addressed DCD COL Item 14.2-6-A.

Supplemental Information

- EF3 SUP 14.2-2 Site-Specific Performance Tests
- EF3 SUP 14.2-3 Site-Specific Pre-Operational Tests

As noted above for EF3 COL 14.2-5-A, the applicant provided these supplemental information items regarding site-specific performance and pre-operational tests. The applicant included this supplemental information in the FSAR in order to describe the site specific preoperational and initial startup tests not addressed in DCD Section 14.2.8 per the requirements of STD COL 14.2-5-A.

The applicant identified one site-specific performance test in the FSAR:

- 14.2.9.2.1 Cooling Tower Performance Test

As noted below, in the Evaluation of Site-Specific Preoperational and Startup Tests, FSER Subsection 10.4.5.2.1 provides the technical discussion of the CIRC which includes the cooling towers. The staff reviewed the site-specific startup test abstract for the Cooling Tower Performance Test. The staff finds that the test abstract provides adequate guidance to develop test procedures to verify proper operation of the waste heat rejection portion of the CIRC.

The staff reviewed Fermi 3 FSAR, Revision 7, Subsection 14.2.9 and the referenced DCD Section 14.2.9 to ensure that with a combination of the DCD and the COL information, a complete scope of information related to this review topic was covered. The staff's review confirmed that the information contained in the application and incorporated by reference addressed required information.

The applicant identified two site-specific pre-operational tests in the FSAR:

- 14.2.9.1.1 Station Water System Pre-Operation Test

As noted below, in the Evaluation of Site-Specific Preoperational and Startup Tests, FSER Section 9.2.10 provides the technical discussion of the Station Water System. The staff reviewed the test abstract for the Station Water System Pre-Operational Test and finds that it contains adequate guidance to develop test procedures to verify that the station water system will operate as designed.

- 14.2.9.1.2 Cooling Tower Preoperational Test

As noted below, in the Evaluation of Site-Specific Preoperational and Startup Tests, FSER Section 10.4.5.2.1 provides the technical discussion of the CIRC which includes the cooling towers. The staff reviewed the test abstract for the Cooling Tower Preoperational test and finds that it contains adequate guidance to develop test procedures to verify that the cooling tower will operate as designed.

Evaluation of the Deletion of Two Site-Specific Preoperational Tests

- FSAR Subsection 14.2.9.1.3, "Personnel Monitors and Radiation Survey Instruments Preoperational Test" (Deleted in Revision 1 to FSAR 14.2.9 per EF3 SUP 14.2-3)

- FSAR Subsection 14.2.9.1.4, “Electrical Switchyard System Preoperational Test” (Deleted in Revision 1 to FSAR 14.2.9 per EF3 SUP 14.2-3)

The NRC staff reviewed Revision 0 to FSAR Subsection 14.2.9.1.3, “Personnel Monitors and Radiation Survey Instruments Preoperational Test.” Subsection 14.2.9.1.3 described the preoperational test for personnel monitors and radiation survey instruments. In Revision 1 to the FSAR, the COL applicant deleted the description of this test abstract from the FSAR. As the basis for deleting this subsection, the COL applicant stated that since personnel monitors and radiation survey instruments, as well as laboratory equipment, are purchased as standard plant commercial grade equipment and are routinely replaced over the life of the plant, this equipment does not meet the RG 1.68 criteria for plant features to be tested in the ITP and, therefore, is not subject to the ITP. Accordingly, in Revision 1 to the FSAR, the COL applicant modified FSAR Table 1.9-202 to take exception to RG 1.68, Appendix A, Items 1.k(2) “personnel monitors and radiation survey instruments” and 1.k(3) “laboratory equipment used to analyze or measure radiation levels and radioactivity concentrations.”

In lieu of testing this equipment as part of the ITP, the COL Applicant stated that the Radiation Protection Program (RPP) provides adequate tests of both laboratory and portable instrumentation used for radiation protection. The COL applicant’s RPP is described in Nuclear Energy Institute (NEI) 07-03A, Revision 0, “Generic FSAR Template Guidance for Radiation Protection Program Description,” which has been incorporated by the applicant in Appendix 12BB of the Fermi 3 FSAR accordingly. NEI 07-03A, Revision 0, provides descriptions of the types of radiation protection instruments and equipment that will be used in the plant. The COL Applicant stated that each new survey instrument or personnel monitor is tested prior to being placed in service to assure conformance with performance requirements. The COL Applicant further stated that the applicable standards for testing radiation monitors and survey instruments, including a description of the proper functioning and operation of range selection and response in each range, are contained in the following documents:

- American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE) N323A, “Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments,” dated December 31, 1997

- ANSI/IEEE N323D, “Installed Radiation Protection Instrumentation,” issued in 2003

ANSI/IEEE N323A is referenced in Table 1.9-22 of the ESBWR DCD and is incorporated by reference by the COL applicant. Since the Fermi 3 FSAR did not contain a reference to ANSI/IEEE N323D, the staff requested that the COL Applicant include a reference to this standard in the FSAR. The COL Applicant agreed to amend Table 1.9-204 of the Fermi 3 FSAR to add a reference to ANSI/IEEE N323D. The staff reviewed Revision 4 of the Fermi 3 FSAR COL and verified that the COL applicant has added a reference to ANSI/IEEE N323D in Table 1.9-204.

The COL applicant’s RPP specifies, in Section 12.5.3.2 of NEI 07-03A, Revision 0, that “radiation monitoring instrumentation and equipment are selected, maintained and used to provide the appropriate detection capabilities, ranges, sensitivities and accuracies required for the types and levels of radiation anticipated at the plant and in the environs during routine operations, major outages, abnormal occurrences, and postulated accident conditions.” NEI 07-03A, Revision 0, also specifies the types of instruments and equipment that will be

available (i.e., tested and ready for service) at specified milestones for the Radiation Protection Program. On this basis, the staff finds that the COL Applicant's laboratory and portable instrumentation used for radiation protection can be adequately tested and maintained under the COL Applicant's RPP (as described in NEI 07-03A, Revision 0). Therefore, the staff finds it acceptable that the test abstract for personnel monitors and radiation survey instruments is removed from the ITP and agrees with the deletion of Subsection 14.2.9.1.3 from the Fermi 3 FSAR.

The NRC staff reviewed Revision 0 to FSAR Subsection 14.2.9.1.4. In Revision 1 to FSAR Subsection 14.2.9, the COL applicant deleted this test abstract (electrical switchyard system preoperational test) and incorporated by reference ESBWR DCD Subsection 14.2.8.1.36 since it is the same test abstract in the approved FSER for the ESBWR DCD. The NRC staff determined that this change meets the requirements of, 10 CFR 52.79(a)(28), RG 1.68 and RG 1.206. Therefore, the staff finds it acceptable that the test abstract for electrical switchyard system preoperational test is removed from the ITP and agrees with the deletion of Subsection 14.2.9.1.4 from the Fermi 3 FSAR.

The staff found that the applicant's site-specific supplemental information EF3 SUP 14.2-2 and EF3 SUP 14.2-3 regarding site-specific performance and preoperational tests were consistent with applicable regulations and guidance. Therefore, the staff determined that the applicant's supplementary information is acceptable.

License Conditions:

On May 27, 2010, in RAI 14.02-4 (ADAMS Accession No. ML101470123), the NRC staff identified all the license conditions pertaining to the review of this section. The NRC imposes license conditions for test activities that cannot be resolved during the COL applicant stage but are resolved after the COL is issued. On July 9, 2010, the applicant responded to this RAI (ADAMS Accession No. ML101960646) and agreed that the license conditions were appropriate and the applicant suggested some minor editorial clarifications, which the staff accepted in part. Therefore this RAI is resolved. These license conditions are currently in Section 3, Revision 5 of Part 10, "ITAAC," included in Revision 7 of the Fermi 3 Combined License Application, and are presented in Section 14.2.5 below.

14.2.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the staff finds the following license conditions acceptable:

License Condition 14-1:

Startup Administrative Manual, Standard

> Prior to initiating the plant's initial test program (ITP), a site specific startup administrative manual (procedures), which includes administrative procedures and requirements that govern the activities associated with the plant ITP is to be provided to on-site NRC inspectors 60 days prior to their intended use.

Preoperational and Startup Test Procedures

During the post-licensing period, preoperational and startup test procedures will be subject to a license condition for NRC inspections to verify that the licensee implements the ITP. This process will allow for the performance of necessary plant as-built inspections and walk downs. The licensee will make available to on-site NRC inspectors preoperational and startup test procedures 60 days prior to their intended use.

Site-Specific Preoperational and Startup Test Procedures

During the post-licensing period, site-specific preoperational and startup test procedures will be subject to NRC inspections to verify that the licensee implements the ITP. This process will allow for the performance of necessary plant as-built inspections and walk downs. The licensee will make available to on-site NRC inspectors site-specific preoperational and startup test procedures 60 days prior to their intended use.

Power Ascension Test Phase Reports

In Section 3.2.4 of Revision 5 of Part 10, "ITAAC," in Revision 7 of the Fermi 3 COL application, the staff identified the following license condition:

Certain milestones in the startup testing phase of the ITP (e.g., pre-critical testing, criticality testing, and low-power testing) should be controlled through this license condition to ensure that the designated licensee management reviews, evaluates, and approves relevant test results before proceeding to the power ascension test phase. Accordingly, the licensee shall perform the following:

(a) Following completion of all pre-critical and criticality testing the licensee shall confirm that the test results are within the range of values predicted in the acceptance criteria in the facility's FSAR. Following these licensee confirmations; the licensee will conduct low-power tests and operate the facility at reactor steady-state core power levels not in excess of 5 percent power, in accordance with the conditions of the license.

(b) Following completion of all low-power testing the licensee shall confirm that the test results are within the range of values predicted in the acceptance criteria in the facility's FSAR. After completing and evaluating low-power test results, the licensee will conduct power ascension testing and will operate the facility at reactor steady-state core power levels not in excess of 100 percent power, in accordance with the conditions of the license.

The licensee is responsible for the review and evaluation of the adequacy of test results presented in the Power Ascension Test Phase reports, as well as final review of overall test results in these reports. Test results, which do not meet acceptance criteria, are identified and corrective actions and retests are performed. The Power Ascension Test Phase reports shall be made available to on-site NRC inspectors.

Test Changes

In Section 3.2.5 of Revision 5 of Part 10, "ITAAC," of the Fermi 3 Combined License Application, the staff has identified following license condition which is related to NRC RAI 14.2-4:

Within one month of any ITP changes described in the Fermi 3 FSAR, Section 14.2, the licensee shall evaluate these changes in accordance with the provisions of 10 CFR 50.59 or the change process defined in 10 CFR Part 52, Appendix E, Section VIII, and report them in accordance with 10 CFR 50.59(d).

Operational Program Readiness

In Section 3.6 of Revision 7 of Part 10, "ITAAC," of the Fermi 3 Combined License Application, the staff has identified the following license condition which is related in part to STD COL 14.2-4-A:

> The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first. This schedule shall also address:
>
> (a) The implementation of site specific Severe Accident Management Guidance.
> (b) The spent fuel rack coupon monitoring program implementation.

14.2.6 Conclusions

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

In addition, the staff compared the information in the application to the relevant NRC regulations, the guidance in Section 14.2 of NUREG-0800, and other NRC regulatory guides. The staff's review concludes that the relevant information in the COL FSAR is acceptable and meets the requirements of 10 CFR 52.79(a)(28) and, Criterion XI of Appendix B to 10 CFR Part 50 along with the guidance in RGs 1.68 and 1.206. The staff evaluated the STD COL Items, EF3 COL items, STD SUP items, and EF3 SUP items identified for this section according to the relevant NRC regulations and acceptance criteria defined in NUREG-0800, Section 14.2. The staff finds that the applicant has satisfactorily addressed these items.

14.3 Inspections, Tests, Analyses, and Acceptance Criteria

14.3.1 Introduction

Section 14.3 of the FSAR, discusses the criteria and methodology for selecting the SSCs to be included in the ITAAC. This section includes the definitions and general provisions, design descriptions, ITAAC, significant site parameters, and significant interface requirements in order to determine whether the resultant ITAAC are adequate to verify that a facility referencing the ESBWR design has been constructed and will be operated in compliance with the design certification and applicable regulations.

14.3.2 Summary of Application

Part 10 of the Fermi 3 COLA, Revision 7 includes the entire set of ITAAC which consists of four parts; Design Certification ITAAC, Emergency Planning ITAAC, Physical Security ITAAC, and Site-Specific ITAAC. The Tier 1 Design Certification ITAAC have been incorporated by reference in Part 10, Section 2.1, “Design Certification ITAAC”, of the Fermi 3 COL FSAR, Revision 7. The NRC staff’s finding related to Design Certification ITAAC incorporated by reference is in NUREG–1966.

The Emergency Planning ITAAC are presented in Part 10, Section 2.3, “Emergency Planning ITAAC”, of the Fermi 3 COL FSAR, Revision 7, and listed in Table 2.3-1, “ITAAC For Emergency Planning”. Evaluations of these ITAAC are contained in FSER Chapter 13.0, “Conduct of Operations”, Section 13.3, “Emergency Planning.” and discussed below regarding the evaluation of STD COL 14.3-1-A.

The Tier 1 Physical Security ITAAC for systems within the scope of the DCD are incorporated by reference in Part 10, Section 2.2, “Physical Security ITAAC”, of the Fermi 3 COL FSAR, Revision 7 and the NRC staff’s findings related to this information incorporated by reference is in NUREG-1966. In addition, the evaluation of the Site-Specific Physical Security ITAAC that have been identified by the applicant in Part 10, Subsection 2.2.1, “Site Specific Physical Security ITAAC”, of the Fermi 3 COL FSAR, Revision 7 and listed in Table 2.2.1-1, “ITAAC for the Site-Specific Security System,” can be found in FSER Chapter 13.0, “Conduct of Operations”, Section 13.6, “Physical Security”, and 13.6A, “Site-Specific ITAAC for Physical Security.”

The Site-Specific ITAAC for site-specific systems that were not evaluated in the referenced DCD are presented by the applicant in Part 10, Section 2.4 “Site-Specific ITAAC,” of the Fermi 3 COL FSAR, Revision 7. The evaluations of these ITAAC are discussed below under the evaluation of STD COL 14.3-2-A.

Section 14.3, of the Fermi 3 FSAR, Revision 7, incorporates by reference Section 14.3 of the ESBWR DCD, Revision 10. In addition, the Fermi 3 FSAR, Revision 7, Section 14.3, provides the following:

COL Items

- STD COL 14.3-1-A Emergency Planning (EP) ITAAC

The applicant provided information regarding their Emergency Planning ITAAC based on industry guidance.

- STD COL 14.3-2-A Site-Specific ITAAC

The applicant provided information regarding their Site-Specific ITAAC for systems not evaluated in the DCD.

- EF3 COL 14.3A-1-1 Schedule for Design Acceptance Criteria (DAC) ITAAC Closure

The applicant provided a DAC ITAAC closure schedule.

14.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966 and NUREG-1966, Supplement 1, the FSER related to the certified ESBWR DCD. In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations for seismic classification are given in Section 14.3 of NUREG-0800.

The applicable regulatory requirements and guidance for the inspections, tests, analysis, and acceptance criteria are as follows:

- 10 CFR 52.79(d)(2), "Contents of applications, technical information in final safety analysis report", as it relates to requiring the COL applicant to demonstrate in the FSAR that the design meets the interface requirements established under 10 CFR 52.47, "Contents of applications; technical information."

- 10 CFR 52.80,"Contents of applications, additional technical information", as it relates to requiring the COL application to contain the proposed inspections, tests, and analyses, including those (a) that are applicable to emergency planning; (b) that the licensee shall perform; and (c) that meet necessary and sufficient acceptance criteria to provide a reasonable assurance that if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will operate in conformity with the COL, the provisions of the Atomic Energy Act, and the Commission's rules and regulations.

- 52.99(a), "Inspection During Construction", as it relates to ITAAC completion schedule

- RG 1.206, Section C.II.1 as it relates to COL ITAAC and Section C.III.5 as it relates to Design Acceptance Criteria.

14.3.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 14.3 of the certified ESBWR DCD. The staff reviewed Section 14.3 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in

the ESBWR DCD and the information in the Fermi 3 COL FSAR, Revision 7, appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information contained in the application and the information incorporated by reference address the relevant information related to this section.

The staff reviewed the information in the Fermi 3 COL FSAR, Revision 7, as follows:

COL Items

- STD COL 14.3-1-A Emergency Planning (EP) ITAAC

The NRC staff evaluation for STD COL 14.3-1-A, "Emergency Planning ITAAC," is addressed in Section 13.3, "Emergency Planning," of Chapter 13, "Conduct of Operations," of the Fermi 3 SER. The staff's evaluation found that the information provided to address this COL item was acceptable. Therefore, for the purposes of this Chapter 14 SER evaluation, the staff finds that the applicant has addressed STD COL 14.3-1-A.

- STD COL 14.3-2-A Site-Specific ITAAC

The selection criteria and methodology provided in this section of the referenced DCD were utilized as the site-specific selection criteria and methodology for ITAAC. These criteria and methodology were applied to those site-specific (SS) systems that were not evaluated in the referenced DCD. In Subsection 14.3.9 of the Fermi 3 COL FSAR, the applicant states that the selection criteria and methodology provided in Subsection 14.3 of the referenced DCD were utilized as the site-specific selection criteria and methodology for ITAAC. These criteria and methodology were applied to those site-specific systems that were not evaluated in the referenced DCD. If a site-specific system described in the FSAR does not meet an ITAAC selection criterion, then the applicant includes just the system title and the statement "No entry for this system". The Fermi 3 COL application Part 10, Section 2.4 addresses the site-specific ITAAC for the following structures, systems, and components (SSCs).

2.4.1 ITAAC for Fill Concrete I Under Seismic Category I Structures

In Revision 3 of Part 10, "ITAAC", the applicant identified the following:

- ITAAC for Backfill Under Seismic Category I Structures

  Not applicable since no compactable backfill will be placed under Fermi 3 Seismic Category I structures.

Initially, the applicant proposed to use lean concrete as the backfill beneath Seismic Category I structures. As a result of staff's RAIs 02.05.04-5 and 02.05.04-31 relating to potential aging effects on lean concrete due to sulfate groundwater conditions, the applicant decided to use fill concrete instead of lean concrete to address the staff's concern regarding the chemical composition requirements for sulfate exposure conditions. In RAI 02.05.04-40 the staff requested the applicant to provide an ITAAC to ensure that the concrete fill placed underneath any Seismic Category I structures to a thickness of greater than 5 feet, meets the design,

[1] See "*Finality of Referenced NRC Approvals*," in SER Section 1.2.2, for a discussion on the staff's review to verification of the scope of information to be included in a COL application that references a design certification.

construction and testing of applicable ACI standards. In the applicant's response dated February 16, 2012 (ADAMS Accession No. ML12052A031), the applicant proposed the following site-specific ITAAC to Part 10 of their application regarding this issue:

- ITAAC for Fill Concrete Under Seismic Category I Structures

  Compactable backfill will not be placed under Fermi 3 Seismic Category I structures. ITAAC for fill concrete placed under Seismic Category I structures to a thickness greater than 5 feet are provided in Table 2.4.1-1.

In the response to RAI 02.05.04-40, the applicant proposed Table 2.4.1-1, which gives the details of the proposed ITAAC for this item. The staff tracked the verification that the next FSAR revision included this change as Confirmatory Item 14.3-1. The staff verified that ITAAC Revision 4 and Revision 5 as well as FSAR Revision 5 and 6 include the proposed site specific ITAAC. Therefore, Confirmatory Item 14.3-1 is resolved. The technical review of the ITAAC is documented in Section 2.5.4 of this SER. The staff concludes that the applicant has satisfactorily addressed the site-specific ITAAC for fill concrete under Seismic Category I structures.

2.4.2 ITAAC for Backfill Surrounding Seismic Category I Structures

In Revision 3 of Part 10, "ITAAC", included in Revision 4 of the Fermi 3 COL FSAR, the applicant identified the following for the system listed above:

- ITAAC for Backfill Surrounding Seismic Category I Structures

  The site parameter values in the Referenced DCD Tier 2, Table 2.0-1 for compactable backfill surrounding the embedded walls of Fermi 3 Seismic Category I structures are not applicable, as discussed in FSAR Subsection 2.5.4 and Subsection 3.7.2. Therefore, no ITAAC are necessary for compactable backfill surrounding the embedded walls of Fermi 3 Seismic Category I structures

In Revision 4 of Part 10, "ITAAC," included in Revision 5 of the Fermi COL FSAR, the applicant revised ITAAC 2.4.2.

In the applicant's response to RAI 02.05.04-39 dated February 16, 2012 (ADAMS Accession No. ML120520154), the applicant has proposed the following changes to Part 10 of their application regarding this issue:

- ITAAC for Backfill Surrounding Seismic Category I Structures

  The ITAAC for compacted backfill surrounding the embedded walls of Seismic Category I structures is provided in Table 2.4.2-1

In the RAI response, the applicant provided proposed Table 2.4.2-1, which gives the details of their proposed ITAAC for this item. The applicant's proposed revision to the application was tracked as Confirmatory Item 14.3-2.

The detailed review of these ITAAC changes is included in Section 2.5.4 of this SER. The staff verified that ITAAC Revisions 4 and 5 as well as FSAR Revisions 5 and 6 include the proposed ITAAC. Therefore, Confirmatory Item 14.3-2 is resolved. The staff concludes that the applicant has satisfactorily addressed the site-specific ITAAC for backfill surrounding Seismic Category I structures.

2.4.3 ITAAC for Plant Service Water System (Portion Outside the Scope of the Certified Design)

In COL Part 10, Section 2.4.3, the applicant has identified interface requirements and site-specific ITAAC for this system. In the staff's SER for Section 9.2.1, the staff reviewed the plant service water system against selection criteria in SRP Section 14.3. The staff concludes that the applicant has satisfactorily addressed the interface requirement and site-specific ITAAC for this system.

2.4.4 Circulating Water System (Portion Outside the Scope of the Certified Design)

In COL Part 10, Section 2.4.4, the applicant states that for the circulating water system there are no site-specific ITAAC entries for this system. The staff reviewed the circulating water system against selection criteria in SRP Section 14.3. The staff concludes that the circulating water system does not perform a safety-related function and is not considered a system "important to safety" therefore, as-built verification, i.e., site-specific ITAAC, is not required.

2.4.5 Station Water System (Including Intake Structure and Servicing Equipment)

COL Part 10, Section 2.4.5 the applicant states that for the station water system there are no site-specific ITAAC entries for this system. In the staff's SER for Section 9.2.10, the staff reviewed the station water system against selection criteria in SRP Section 14.3. The staff concludes that the station water system does not perform a safety-related function and is not considered a system "important to safety"; therefore, as-built verification, i.e., site-specific ITAAC, is not required.

2.4.6 Yard Fire Protection System (Portions Outside the Scope of the Certified Design)

In COL Part 10, Section 2.4.6, the applicant states that for the yard fire protection system there are no entries for site-specific ITAAC. The staff reviewed the yard fire protection system against selection criteria in SRP Section 14.3. The staff concludes that the yard fire protection system does not perform a safety-related function and is not considered a system "important to safety"; therefore, as-built verification, i.e., site-specific ITAAC, is not required.

2.4.7 Potable & Sanitary Water Systems

In COL Part 10, Section 2.4.7, the applicant states that for the potable & sanitary water system there are no site-specific ITAAC entries for this system. In the staff's SER for Section 9.2.4, the staff reviewed the potable & sanitary water systems against selection criteria in SRP Section 14.3. The staff concludes that the potable & sanitary water systems do not perform a safety-related function and are not considered a system "important to safety"; therefore, as-built verification, i.e., site-specific ITAAC, is not required.

2.4.8 Offsite Power Systems

In COL Part 10, Section 2.4.8, the applicant has identified interface requirements and site-specific ITAAC for this system. The interface requirements specified come directly from DCD Tier 1, Section 4.2. On February 24, 2009, in RAI 14.03.06-1 (ADAMS Accession No. ML090540582), the staff requested for the applicant to develop an ITAAC based on these interface requirements. On March 25, 2009 (ADAMS Accession No. ML091060495), the applicant responded to this RAI and provided an ITAAC which is now Table 2.4.8-1 in Part 10 of the Fermi 3 COL Revision 4. In addition, the applicant further described their responses to RAI 14.03.06-1 regarding this issue in their August 29, 2009 response to RAI 08.02-8 (ADAMS Accession No. ML0924504830). As discussed in the staff's SER for Section 8.2, the staff has found that the proposed ITAAC for this system will ensure that each as-built offsite circuit has sufficient capacity and capability. The staff reviewed the offsite power system against selection criteria in SRP Section 14.3. The staff concludes that the applicant has satisfactorily addressed the interface requirement and site-specific ITAAC for this system.

2.4.9 Communication Systems (Emergency Notification System)

In COL Part 10, Section 2.4.9, the applicant states that the site-specific ITAAC for this system is addressed in Table 2.3-1, Topic 6.0, Emergency Communications. The complete review of the applicant's site-specific emergency plan ITAAC is contained in SER Section 13.3. Based on that evaluation, the staff has found that the applicant has satisfactorily addressed the site-specific ITAAC for this system.

2.4.10 Makeup Water System

In COL Part 10, Section 2.4.10, the applicant states that for the makeup water system there are no site-specific ITAAC entries for this system. In the staff's SER for Section 9.2.3, the staff reviewed the makeup water system against selection criteria in SRP Section 14.3. The staff concludes that the makeup water system does not perform a safety-related function and is not considered a system "important to safety"; therefore, as-built verification, i.e., site-specific ITAAC, is not required.

2.4.11 deleted

In order to be consistent with the ESBWR DCD, on July 29, 2009 the staff issued RAI 14.03.07-1 (ADAMS Accession No. ML09210072) requesting for the applicant to update this section to no longer refer to the use of a mobile liquid waste management system. Per the applicant's RAI response dated September 24, 2009 (ADAMS Accession No. ML092720656), the applicant has deleted this section accordingly. The staff finds that this issue has been resolved and this RAI 14.03.07-1 is closed.

2.4.12 deleted

In order to be consistent with the ESBWR DCD, on July 29, 2009 the staff issued RAI 14.03.07-2 (ADAMS Accession No. ML09210072) requesting for the applicant to update this section to no longer refer to the use of a mobile solid waste management system. Per the applicant's RAI response dated September 24, 2009 (ADAMS Accession No. ML092720656), the applicant has deleted this section accordingly. The staff finds that this issue has been resolved and RAI 14.03.07-2 is closed.

2.4.13 Hydrogen Water Chemistry System

In COL Part 10, Section 2.4.13, the applicant states that for the hydrogen water chemistry system (HWCS) there are no site-specific ITAAC entries for this system. Staff reviewed the HWCS against selection criteria in SRP Section 14.3. The staff concludes that the HWCS does not perform a safety-related function and is not considered a system "important to safety"; therefore, as described in ESBWR DCD Table 14.3-1, Revision 9, an ITAAC is not required for this system.

2.4.14 Meteorological Monitoring System

In COL Part 10, Section 2.4.14, the applicant states that for the meteorological monitoring system there are no site-specific ITAAC entries for this system. The staff reviewed the meteorological monitoring system against selection criteria in SRP Section 14.3. The staff notes that there are several emergency plan ITAACs in COL Part 10, Section 2.3 that require the acquisition and evaluation of meteorological data. The staff concludes that additional site-specific ITAAC are not required for the meteorological monitoring system.

Based on the NRC staff evaluation of the information provided by the applicant related to the Site-Specific ITAAC cited above, the NRC staff deems the information to meet the requirements in 10 CFR 52.79(d)(2), 52.80(a) and the acceptance criteria in NUREG-0800, Chapter 14.3, "Inspections, Tests, analyses, and Acceptance Criteria." In addition, the staff has reviewed the applicant's information to address COL Item 14.3-2-1 and found that it is acceptable and meets the relevant requirements and the guidance set forth in RG 1.206, Section C.II.1.

- EF3 COL 14.3A-1-1 Schedule for Design Acceptance Criteria (DAC) ITAAC Closure

DCD Appendix 14.3A "Design Acceptance Criteria ITAAC Closure Process", sets forth three options for closing DAC ITAAC. The applicant has chosen the third option which entails resolution through DAC ITAAC after COL issuance. COL Item 14.3A-1-1 requires the applicant to provide a DAC ITAAC closure schedule and also identify whether the standard approach will be used. The applicant has not chosen to use the standard approach by identifying this item as EF3 COL 14.3A-1-1.

In order to address the closure schedule for DAC ITAAC, the applicant provided additional commitments in their application. However, based on Revision 2 of the application, the staff noted that the risk-significant piping packages completion schedule did not support closure of the DAC ITAAC on a system basis and the current proposed position did not meet 10 CFR 52.99(a). In RAI 14.03.03-1 (ADAMS Accession No. ML102590195) dated September 16, 2010, the staff requested for the applicant to provide an acceptable alternative or clarify the applicant's position to support closure of DAC ITAAC. In the applicant's responses dated October 19, 2010 (ADAMS Accession No. ML102940218) and June 15, 2012 (ADAMS Accession No. ML12170A664), the applicant provided clarification and commitments to their implementation schedules for DAC ITAAC completion and proposed revisions to their commitments associated with these DAC ITAAC, which are separately itemized for piping DAC (including the Pipe Break Analysis Report), human factors engineering DAC, and instrumentation and controls DAC. The staff finds that the applicant has adequately clarified their position to support closure of DAC ITAAC, thus RAI 14.03.03-1 is closed. In addition, the staff has found that the applicant's proposed revisions to their commitments for the DAC ITAAC closure schedule are satisfactory and were tracked as Confirmatory Item 14.3-3. The

aforementioned schedule and DAC commitments are listed below in Post Combined License Activities. The staff tracked the verification that the next FSAR revision included this change. The staff verified that FSAR Revision 7 includes the proposed revisions. Therefore, Confirmatory Item 14.3-3 is resolved.

The staff has reviewed the applicant's information to address COL Item 14.3A-1-1 and found that it is acceptable, because it meets the relevant requirements of 10 CFR 52.99(a) and the guidance set forth in RG 1.206, Sections C.II.1 and C.III.5.

14.3.5 Post Combined License Activities

As discussed above, the applicant has proposed the following commitments in this section:

> Commitment (COM 3.10-003) - Detroit Edison shall submit to the NRC, no later than 1 year after issuance of the combined license or at the start of construction as defined in 10 CFR 50.10(a), whichever is later, its implementation schedules for completing of the following ITAACs. Detroit Edison shall submit updates to the ITAAC schedules every 6 months thereafter and, within 1 year of its scheduled date for initial loading of fuel, shall submit updates to the ITAAC schedules every 30 days until the final notification is provided to the NRC under paragraph (c)(1) of this section.
>
> Commitment (COM 14.3-001) - For piping DAC ITAAC; (1) The ASME Code design reports for safety-related piping packages and (2) The as-designed Pipe Break Analysis Report will be completed per ESBWR DCD ITAAC Table 3.1-1 for all the applicable systems in order to support closure of the Design Acceptance Criteria ITAAC. Information will be made available for NRC review, inspection, and audit on a system basis. Information will be made available to the NRC to facilitate reviews, inspections, and audits throughout the process.
>
> Commitment (COM 14.3-002) - For human factors engineering DAC, HFE Design Acceptance Criteria ITAAC consists of a series of results summary reports which verify that the specific associated Design Commitment is met. The summary reports will be made available at each stage for NRC review, inspection, and audit on an element by element basis. Information (procedures and test programs) will be made available to the NRC to facilitate reviews, inspections, and audits throughout the process.
>
> Commitment (COM 14.3-003) - For instrumentation and controls DAC, the set of ESBWR digital I&C Design Acceptance Criteria ITAAC establishes a phased Design Acceptance Criteria ITAAC closure process. Procedures and test programs necessary to demonstrate that the Design Acceptance Criteria ITAAC requirements are met will be used at each phase to certify to the NRC that the design is in compliance with the certified design. Information will be made available for NRC review, inspection, and audit on a system basis. Information will be made available to the NRC to facilitate reviews, inspections, and audits throughout the process.

14.3.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966 and NUREG-1966, Supplement 1. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this

section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference are resolved.

In addition, the staff compared the information in the application to the relevant NRC regulations, the guidance in Section 14.3 of NUREG-0800, and other NRC regulatory guides. The staff's review concludes that the relevant information in the COL FSAR is acceptable and meets the requirements of 10 CFR 52.79(d)(2), 10 CFR 52.80, and 10 CFR 52.99(a); and the guidance in RG 1.206, Regulatory Positions C.II.1 and C.III.5. The staff evaluated STD COL 14.3-1-A, STD COL 14.3-2-A, and EF3 COL 14.3A-1-1 according to the relevant NRC regulations and acceptance criteria defined in NUREG-0800, Section 14.3. The staff finds the applicant has satisfactorily addressed these items.

15.0 SAFETY ANALYSES

15.1 Introduction

This chapter provides analyses of the plant's responses to postulated disturbances in process variables and postulated equipment failures or malfunctions, determines their consequences, and evaluates the capability of the plant to control or accommodate these events. These analyses help determine the limiting conditions for operation, limiting safety system settings, and design specifications for safety-related components and systems.

The analyses in this chapter includes a discussion of: (1) the classification of the transients and accidents and their results in the context of a sufficiently broad spectrum of initiating events and postulated equipment failures, (2) the frequency of occurrence for initiating events for anticipated operational occurrences and highly unlikely accidents, (3) plant characteristics considered in the safety evaluation, (4) assumed protection system actions, (5) evaluation of individual initiating events and systems that operate to reduce the probability of occurrence of specific events, and (6) analysis of anticipated transients without scram. The safety analyses provide a significant contribution to the selection of limiting conditions for plant operation, limiting safety system settings, and design specifications for plant components and systems from the standpoint of public health and safety.

15.2 Summary of Application

Chapter 15 of the Fermi 3 Combined License (COL) Final Safety Analysis Report (FSAR), Revision 7 incorporates by reference, with no departures, Chapter 15 of Revision 10 of the certified Economic Simplified Boiling-Water Reactor (ESBWR) Design Control Document (DCD). In addition, in FSAR Chapter 15, the applicant provides the following:

Supplemental Information

- STD SUP 15.3-1

The applicant states that the procedures will discuss the use of nuclear instrumentation to aid in detecting a possible mislocated fuel bundle after a fueling operation.

- EF3 SUP 15.4-1

In a letter dated August 22, 2014 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML14237A333), the applicant provides supplemental information in Section 15.4.1 of the COL FSAR, which discusses administrative control of certain doors or personnel air locks during movement of irradiated fuel, as related to the design basis accident control room habitability dose analysis for the fuel handling accident.

15.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor." In addition, STD SUP 15.3-1 is subject to the requirements of General Design Criterion (GDC) 13, "Instrumentation and Control," and the relevant guidance of the Commission regulations in the acceptance criteria of Section 15.4.7, "Inadvertent Loading and Operation of a

Fuel Assembly in an Improper Position," of NUREG–0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, (LWR Edition)," the Standard Review Plan (SRP).

15.4 Technical Evaluation

As documented in NUREG–1966, U.S. Nuclear Regulatory Commission (NRC) staff reviewed and approved Chapter 15 of the certified ESBWR DCD. The staff reviewed Chapter 15 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The NRC staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to safety analyses.

The staff reviewed the information in the COL FSAR:

Supplemental Information

- STD SUP 15.3-1

The applicant states that the procedures will detail the use of nuclear instrumentation in helping to detect a possible mislocated fuel bundle after fuel loading. The staff found the supplemental information acceptable because it is consistent with the acceptance criteria in SRP Section 15.4.7, which states that plant operating procedures should include a provision requiring that reactor instrumentation be used to search for potential fuel-loading errors after fueling operations, in order to meet the requirements of GDC 13.

- EF3 SUP 15.4-1

By a letter dated August 22, 2014 (ADAMS Accession No. ML14237A333), the applicant provided supplemental information to clarify operator actions that are related to the analysis of the design basis fuel handling accident (FHA) radiological consequences in the Fermi Unit 3 control room. Specifically, the applicant proposes to add the following site-specific supplemental information to the next revision of FSAR Subsection 15.4.1.2.3, "Identification of Operator Actions:"

> During movement of irradiated fuel, doors or personnel air locks on the east sides of the Reactor Building or Fuel Building could act as a point source that could result in control room χ/Q values that are higher than the ESBWR χ/Q values for a release in the Reactor Building or Fuel Building (See Subsection 2A.2.5). Therefore, the doors and personnel air locks on the east sides of the Reactor Building and Fuel Building are administratively controlled to remain closed during movement of irradiated fuel. Administrative control of these doors and air locks ensures that the control room habitability dose analysis for the fuel handling accident (FHA) incorporated by reference from ESBWR DCD Section 15.4.1 is bounding for Fermi Unit 3 and control room doses do not exceed the requirements of GDC 19 in the event of a FHA.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

ESBWR DCD, COL Item 2A.2-2-A, "Confirmation of the Reactor Building χ/Q Values," gives guidance to COL applicants that if the site-specific point source control room receptor atmospheric dispersion factors (χ/Q) values for potential releases through doors or personnel air locks on the east sides of the reactor building (RB) and fuel building (FB) are greater than those used as site parameter values in the ESBWR DCD dose analysis for the FHA and would result in a higher radiological consequence than was reported in the DCD, then the affected doors or air locks are administratively controlled during movement of irradiated fuel. The applicant did not provide site-specific point source control room receptor χ/Q values for releases through the doors and air locks on the east sides of the RB and FB or a comparison to the values used in the ESBWR DCD for the FHA to make a determination whether the dose in the control room for the FHA would be higher than reported in the ESBWR DCD. Instead, the applicant stated in EF3 COL 2A.2-2-A that the affected doors and air locks are administratively controlled to remain closed during movement of irradiated fuel. This statement was repeated in Supplemental Item EF3 SUP 15.4-1 with additional information to include the relationship to the assumptions used in the FHA control room dose analysis. The staff finds the supplemental information acceptable because administrative control of the doors and air locks on the east side of the RB and FB during the movement of irradiated fuel provides assurance that in the event of an FHA, releases through the doors are sufficiently prevented so that the FHA dose analysis incorporated by reference from ESBWR DCD Tier 2 Section 15.4.1 is bounding for Fermi Unit 3. The applicant's commitment to providing EF3 SUP 15.4-1 in a future revision of the FSAR is Confirmatory Item 15-1. The staff verified that FSAR Revision 7 includes EF3 SUP 15.4-1. Therefore, Confirmatory Item 15-1 is resolved.

Section 2.3.4, "Short-Term (Accident) Diffusion Estimates," of this safety evaluation report (SER) discusses the staff's evaluation of the radiological consequences associated with design-basis accidents (DBAs) and comparison of site characteristic atmospheric dispersion estimates to the DCD analysis assumptions as discussed in ESBWR COL Information Item 2.0-1-A, "Site Characteristics Demonstration." The DBA radiological consequence analyses in the ESBWR DCD used design reference site parameter values for the offsite χ/Qs, in place of site characteristic (site-specific) values. The χ/Q values are the only input to the DBA radiological consequence analyses that are affected by the site characteristics. The applicant provided and discussed the Fermi 3 site characteristic short-term accident χ/Q values in FSAR Sections 2.3.4 and Appendix 2A in response to COL information items EF3 COL 2.0-10-A, "Short-Term Dispersion Estimates for Accidental Atmospheric Releases," and EF3 COL 2A.2-1-A, "Confirmation of the ESBWR χ/Q Values."

The estimated DBA dose for a particular site is affected by the site characteristics through the calculated χ/Q input to the analysis; therefore, the resulting dose would be different than that calculated generically for the ESBWR design in the DCD. All other inputs and assumptions in the radiological consequences analyses remain the same as those in the DCD. Smaller χ/Q values are associated with greater dilution capability, resulting in lower radiological doses. When comparing a DCD site parameter χ/Q value and a site characteristic χ/Q value, the site is acceptable for the design if the site characteristic χ/Q value is smaller than the site parameter χ/Q value. Such a comparison shows that the site has better dispersion characteristics than that required by the reactor design.

For each time averaging period, the Fermi 3 site characteristic offsite and control room short-term χ/Q values are less than the site parameter χ/Q values used by the ESBWR DCD, Revision 10, radiological consequence analysis for each of the DBAs. Since the result of the radiological consequence analysis for a DBA during any time period of radioactive material release from the plant is directly proportional to the χ/Q for that time period, and because the

Fermi 3 site characteristic χ/Q values are less than the comparable ESBWR DCD site parameter χ/Q values for all time periods and all accidents, the Fermi 3 site-specific total dose for each DBA is therefore less than the ESBWR DCD, Revision 10, generic total dose for each DBA. The ESBWR DCD, Revision 10, analyses show that the offsite, control room, and the technical support center (TSC) radiological consequences meet the regulatory dose requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 100.21, "Non-seismic siting criteria," 10 CFR 50.34(a)(1), and 10 CFR 52.79(a)(1) for offsite receptors, GDC 19 "Control room"; and Paragraph IV.E.8 of Appendix E "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," for the TSC. Because, the Fermi 3 site-specific DBA offsite, control room and TSC doses are less than those given in the ESBWR DCD, the applicant has sufficiently shown that the Fermi 3 DBA radiological consequences meet the requirements of 10 CFR 100.21, 10 CFR 50.34(a)(1), 10 CFR 52.79(a)(1), GDC 19 and Paragraph IV.E.8 of Appendix E to 10 CFR Part 50.

Technical Specifications

COL application Part 4, "Technical Specifications," Section 5.6.3, "Core Operating Limit Report (COLR)," Item (c) states:

> The core operating limits shall be determined such that all applicable limits, (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC. The Fermi 3 technical specifications are evaluated in Chapter 16 of this SER.

15.5 Post Combined License Activities

The applicant states in Supplemental Information EF3 SUP 15.4-1 that the doors and personnel air locks on the east sides of the Reactor Building and Fuel Building are administratively controlled to remain closed during movement of irradiated fuel.

15.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this chapter. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix E, "Design Certification Rule for the Economic Simplified Boiling-Water Reactor," Section VI.B.1, all nuclear safety issues relating to "Safety Analyses" that were incorporated by reference are resolved.

In addition, the staff finds that the additional information in the application meets the relevant NRC regulations and is consistent with the guidance in Chapter 15 of NUREG–0800.

16.0 TECHNICAL SPECIFICATIONS

16.1 Introduction

Technical specifications (TS) impose limits, operating conditions, and other requirements on reactor facility operation for the protection of public health and safety. The Fermi Nuclear Power Plant Unit 3 (Fermi 3) plant-specific technical specifications (PTS) are derived from the analyses and evaluations in the Economic Simplified Boiling-Water Reactor (ESBWR) generic design control document (DCD) and the Fermi 3 Final Safety Analysis Report (FSAR). In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36, "Technical Specifications"; 10 CFR 50.36a, "Technical Specifications on Effluents from Nuclear Power Reactors"; and 10 CFR 52.79(a)(30); Detroit Edison Company (Detroit Edison) provided PTS and the associated PTS bases (bases) for Fermi 3 in Chapter 16, "Technical Specifications," of Part 2, "Final Safety Analysis Report," and Part 4, "Technical Specifications," of the combined license (COL) application. The applicable regulations are 10 CFR 50.36, 10 CFR 50.36a, 10 CFR 52.79(a)(30), and Section IV.A.2 of the ESBWR design certification rule (DCR), Appendix E, "Design Certification Rule for the Economic Simplified Boiling-Water Reactor," to 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

16.2 Summary of Application

Chapter 16 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Chapters 16 and 16B (the generic TS [GTS] and the associated GTS bases [bases], respectively) of the certified ESBWR DCD, Revision 10. In addition, in FSAR Chapter 16, the applicant provides the following:

COL Item

- STD COL 16.0-1-A COL Applicant Bracketed Items

The applicant provides additional information in Part 4 of the Fermi 3 COL application to address the ESBWR DCD standard (STD) COL [Item] 16.0-1-A. The applicant replaced information indicated with brackets in the GTS and bases with site-specific information (site-specific TS and bases).

Supplemental Information

- STD SUP 16.0-1

The applicant provides the following supplemental (SUP) information stating that the PTS and PTS bases are maintained as separate documents:

The proposed PTS consist of the GTS and site-specific information. Detroit Edison also proposed bases for the PTS, which consist of the GTS bases and site-specific information.

The GTS contain items regarding site-specific information that a COL applicant must provide with the PTS to complete a particular GTS provision (e.g., incorporation of the U.S. Nuclear Regulatory Commission [NRC] approved methodology into a plant's licensing basis). Detailed design information, equipment selection, instrumentation settings, and other information not available at the time of design certification (DC) are necessary to establish the values or

information included in the PTS. The GTS and bases indicate each preliminary or missing information item with brackets and a COL item number. Although the ESBWR generic DCD refers to this preliminary or missing information as COL applicant bracketed items, and the COL application designates this information collectively as STD COL 16.0-1-A, this report identifies this information collectively as COL Item 16.0-1-A. Except for the completion of this COL item, the PTS and bases are identical to the GTS and bases.

Exemptions

Detroit Edison proposed no exemptions from the GTS and bases.

COL Item Resolution

Table 16.1 of this report lists the GTS requirements and associated bases that contain placeholders for preliminary or missing information associated with COL items. The COL applicant must finalize these items to complete the PTS and bases. This table also lists the method (i.e., Option 1, 2, or 3) that Detroit Edison used to resolve each COL item, thereby completing the associated provisions in the PTS and bases.

The listed resolution method (RM) for each COL item is taken from Part 4 of the COL application and is based on the interim staff guidance (ISG) DC/COL-ISG-08, "Necessary Content of Plant-Specific Technical Specifications When a Combined License Is Issued," and Section 16.0, "Technical Specifications," Revision 3, (issued in March 2010) of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," the Standard Review Plan (SRP). This guidance lists three acceptable RMs for resolving COL items and finalizing the PTS. For each COL item, the applicant must provide one of the following:

- a site-specific value or site-specific information (Option 1)
- a useable value or useable information that is bounding to the site-specific value or information (Option 2)
- a staff-approved administrative control TS for the use of an NRC-approved methodology to determine the site-specific value or information and establish a document for recording the site-specific value or information outside the PTS (Option 3)

The GTS contains bracketed, optional provisions that provide operational flexibility. However, adopting that flexibility in the PTS requires a site-specific justification in accordance with the reviewer's notes in Table 16.0-1-A of the ESBWR DCD. In most cases, Detroit Edison has not adopted this flexibility in the Fermi 3 PTS. The RM for such items is listed as Option 1 in Table 16.1 because finalizing bracketed information, where the brackets provide for operational flexibility, is equivalent to providing site-specific information. For all COL items listed in the table, the staff has verified that the PTS and bases have been updated in accordance with the stated RM.

Table 16.1. Site-Specific Information To Resolve COL Item 16.0-1-A

COL Item Number	GTS Reference	Information Needing Finalization (See description in Revision 10 of ESBWR DCD, Tier 2, Section 16.0, and Revision 5 of Part 4 included in Revision 7 of the COL application)	Resolution Method
1.1-1	GTS 1.1	Pressure and temperature (P/T) limits report (PTLR) definition.	Option 2
3.1.3-1	GTS 3.1.3 Required Action A.1 and bases	Stuck control rod separation requirements between “slow” control rod(s). (Operational flexibility not adopted.)	Option 1
3.1.3-2	Surveillance Requirement (SR) 3.1.3.4 and bases	Maximum scram time limits for operable control rods. If adopting slow control rod optional allowance, the SR should state, “Verify each control rod scram time from fully withdrawn to [60]% rod insertion is ≤ [ ] seconds.” Otherwise, the SR should state, “Perform applicable SRs of LCO 3.1.4.” (Operational flexibility not adopted.)	Option 1
3.1.4-1	GTS 3.1.4 and bases; Limiting Condition for Operation (LCO) 3.1.4 and bases; Action A and bases; Table 3.1.4-1 Notes and bases; bases’ applicable safety analyses (ASA) discussion; bases for SR 3.1.4.2 and SR 3.1.4.3.	“Slow” control rod optional allowance. (Operational flexibility not adopted.) Detroit Edison removed the bracketed provisions for “slow” scram times in the GTS and bases.	Option 1
3.1.5-1	SR 3.1.5.1 and bases	Minimum and nominal control rod scram accumulator pressure.	Option 2
3.1.7-1	GTS 3.1.7 Required Action A.1 and bases	Alternative action for sodium pentaborate concentration not within limits. (Operational flexibility not adopted.)	Option 1
3.3.1.1-2	Bases for SR 3.3.1.1.4	Allowance to exclude certain sensors or other instrumentation components from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.1.2-1	Bases for SR 3.3.1.2.4	Allowance to exclude certain portions of the actuation circuitry from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.1.4-2	Bases for SR 3.3.1.4.7	Allowance to exclude certain sensors or other instrumentation components from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.1.5-2	Bases for SR 3.3.1.5.4	Allowance to exclude certain portions of the actuation circuitry from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.5.1-2	Bases for SR 3.3.5.1.4	Allowance to exclude certain sensors or other instrumentation components from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.5.2-1	Bases for SR 3.3.5.2.4	Allowance to exclude certain portions of the actuation circuitry from response time testing. (Operational flexibility not adopted.)	Option 1

COL Item Number	GTS Reference	Information Needing Finalization (See description in Revision 10 of ESBWR DCD, Tier 2, Section 16.0, and Revision 5 of Part 4 included in Revision 7 of the COL application)	Resolution Method
3.3.5.3-2	Bases for SR 3.3.5.3.4	Allowance to exclude certain sensors or other instrumentation components from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.5.4-1	Bases for SR 3.3.5.4.4	Allowance to exclude certain portions of the actuation circuitry from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.6.1-2	Bases for SR 3.3.6.1.4	Allowance to exclude certain sensors or other instrumentation components from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.6.2-1	Bases for SR 3.3.6.2.4	Allowance to exclude certain portions of the actuation circuitry from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.6.3-2	Bases for SR 3.3.6.3.4	Allowance to exclude certain sensors or other instrumentation components from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.6.4-1	Bases for SR 3.3.6.4.4	Allowance to exclude certain portions of the actuation circuitry from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.7.1-2	Bases background for GTS 3.3.7.1	Control room habitability area (CRHA) option for design features to protect occupant exposures to hazardous chemicals. (Not adopted based on FSAR Section 6.4.5 and resolution of related Request for Additional Information ([RAI]) 02.02.03-5.)	Option 1
3.3.7.1-3	Bases for SR 3.3.7.1.4	Allowance to exclude certain sensors or other instrumentation components from response time testing. (Operational flexibility not adopted.)	Option 1
3.3.7.2-1	Bases background for GTS 3.3.7.2	CRHA option for design features to protect occupant exposures to hazardous chemicals. (Not adopted based on FSAR Section 6.4.5 and resolution of related RAI 02.02.03-5.)	Option 1
3.3.7.2-2	Bases for SR 3.3.7.2.4	Allowance to exclude certain portions of the actuation circuitry from response time testing. (Operational flexibility not adopted.)	Option 1
3.4.4-1	LCO 3.4.4 and bases; SRs 3.4.4.1, 2, 3, 4, and 5 and bases; bases background	Reference to PTLR or plant-specific P/T curves as figures in TS 3.4.4. (Adopted PTLR.)	Option 2
3.4.4-2	Notes to SR 3.4.4.4, and SR 3.4.4.5 and bases	Temperature for applicability of verification that reactor vessel flange and head flange temperatures are within limits.	Option 2
3.4.4-3	Bases references for GTS 3.4.4	Topical reports (TRs) providing the methodology for determining the P/T limits. (Adopted PTLR.)	Option 2

COL Item Number	GTS Reference	Information Needing Finalization (See description in Revision 10 of ESBWR DCD, Tier 2, Section 16.0, and Revision 5 of Part 4 included in Revision 7 of the COL application)	Resolution Method
3.7.2-1 (related to COL Item 6.4-2-A)	GTS 3.7.2 Required Action B.2 and bases; bases background discussion; bases ASA discussion; bases for LCO 3.7.2; bases for SR 3.7.2.7	CRHA option for design features to protect occupant exposures to hazardous chemicals. (Not adopted based on FSAR Section 6.4.5 and resolution of related RAI 02.02.03-5.)	Option 1
3.7.4-1	LCO 3.7.4 and bases; bases ASA discussion; bases for Required Action A.1	LCO 3.7.4 alternative to requiring the main turbine bypass system to be operable. The alternative LCO is to make applicable the LCO 3.2.2, “Minimum Critical Power Ratio (MCPR),” limits for an inoperable main turbine bypass system, as specified in the core operating limits report (COLR). (Operational flexibility not adopted.)	Option 1
3.7.4-2	SR 3.7.4.1 frequency and bases	Surveillance interval for cycling a turbine bypass valve. (Retained 31-day frequency. Operational flexibility not adopted.)	Option 1
3.7.6-1	LCO 3.7.6 and bases; bases ASA discussion; bases for Required Action A.1	LCO 3.7.6 alternative to requiring all selected control rod run-in (SCRRI) and select rod insert (SRI) functions to be operable. The alternative LCO is to make applicable the LCO 3.2.2 MCPR limits for an inoperable SCRRI and/or SRI function, as specified in the COLR. (Operational flexibility not adopted.)	Option 1
3.8.1-1	SR 3.8.1.2 and bases	Acceptance criteria for battery charger testing (minimum duration of test in hours) consistent with battery size. (Manufacturer’s recommendations are the basis for bounding value for test duration.)	Option 2
3.8.1-4	Bases for SR 3.8.1.1	Battery cell parameters consistent with the manufacturer’s specifications.	Option 1
3.8.1-5	Bases background for GTS 3.8.1, and bases for SR 3.8.1.1	Battery margin for aging factor and state of charge uncertainty (from expected battery life).	Option 1
3.8.3-1	Conditions B, C, and G; Required Actions B.2 and C.2; bases for Actions B, C, and G; bases for SR 3.8.3.1	Acceptance criteria for verification that battery is fully charged—maximum float current—consistent with manufacturer’s recommendations.	Option 1
3.8.3-3	GTS 3.8.3: Actions A and G and SR 3.8.3.5; SR 3.8.3.2; bases background; bases for Actions A, B, C, and G; bases for SRs 3.8.3.2 and 3.8.3.5	Battery cell parameters consistent with the manufacturer’s specifications. Minimum connected cell float voltage. Minimum pilot cell float voltage.	Option 1
3.8.3-4	SR 3.8.3.6 frequency and bases	Battery margin for aging factor and state of charge uncertainty (based on the manufacturer’s recommendations).	Option 1

COL Item Number	GTS Reference	Information Needing Finalization (See description in Revision 10 of ESBWR DCD, Tier 2, Section 16.0, and Revision 5 of Part 4 included in Revision 7 of the COL application)	Resolution Method
3.9.5-1	SR 3.9.5.2 and bases; bases for LCO 3.9.5	Minimum control rod drive scram accumulator pressure.	Option 2
4.1-1	GTS 4.1	Plant-specific description of site location.	Option 1
5.2.2-1	GTS 5.2.2	Non-licensed operator manning requirements for multi-unit site. (Not applicable; Fermi 3 is a single-unit facility.)	Option 1
5.3.1-1	GTS 5.3.1	Unit staff qualification requirements.	Option 1
5.4.1-1	GTS 5.4.1.a	Guidance documents for written procedures.	Option 1
5.4.1-2	GTS 5.4.1.b	Guidance documents for emergency operating procedures.	Option 1
5.5.6-1	GTS 5.5.6	Outdoor Liquid Storage Tank Radioactivity Monitoring Program. (Not applicable to Fermi 3.)	Option 1
5.5.9-1	GTS 5.5.9	Containment Leakage Rate Testing Program plant-specific exceptions to RG 1.163. (Detroit Edison requested no additional plant-specific exceptions.)	Option 1
5.5.10-1	GTS 5.5.10.a	Battery cell parameters consistent with the manufacturer's specifications. Minimum connected cell float voltage.	Option 1
5.5.11-1	GTS 5.5.11	Setpoint Control Program references to NRC staff-approved setpoint methodology and the associated NRC safety evaluation report.	Option 1
5.5.12-1	GTS 5.5.12	CRHA Boundary Program requirements for hazardous chemical releases. (Not adopted based on FSAR Section 6.4.5 and resolution of related RAI 02.02.03-5.)	Option 1
5.6.1-1	GTS 5.6.1	Applicant to determine if allowance for multiple-unit stations is applicable to PTS. If applicable, a single annual radiological environmental operating report may be prepared. (Allowance applies because Fermi 2 and 3 are on the same site.)	Option 1
5.6.1-2	GTS 5.6.1	Applicant to determine format of annual radiological environmental operating report. (Multi-unit format applies.)	Option 1
5.6.2-1	GTS 5.6.2	Applicant to determine if allowance for multi-unit stations is applicable to PTS. If applicable, a single radioactive effluent release report, with content required for a multi-unit report, may be prepared. (Allowance applies because Fermi Units 2 and 3 are on the same site.)	Option 1
5.6.3-1	GTS 5.6.3	COLR reference to Specification 3.7.4, "Main Turbine Bypass System" (see COL Item 3.7.4-1). (Operational flexibility not adopted.)	Option 1
5.6.3-2	GTS 5.6.3.a	Reference in TS 5.6.3.a to any additional individual specifications that address core operating limits.	Option 1
5.6.4-1	GTS 5.6.4	Applicant to add list of analytical methods used to determine the reactor coolant system P/T limits in specification for PTLR, if PTLR adopted in PTS. In lieu of a PTLR, the applicant may insert its plant-specific P/T curves as figures in PTS 3.4.4 and omit PTS 5.6.4. (Adopted PTLR.)	Option 2

The above COL items are listed in Revision 10 to ESBWR DCD Table 16.0-1-A, which provides the COL applicant with guidance on the necessary site-specific information for each item.

16.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor," and NUREG-1966, Supplement 1. In addition, the relevant requirements of the Commission regulations for TS, and the associated acceptance criteria, are in Section 16.0 of NUREG–0800.

The applicable regulatory requirements for TS are as follows:

- 10 CFR 50.36 and 50.36a
- 10 CFR 52.79(a)(30)

Section 182a of the Atomic Energy Act of 1954 (the Act) as amended (42 U. S. C. 2232), requires that applicants for nuclear power plant operating licenses will state the following:

> Such technical specifications, including information of the amount, kind, and source of special nuclear material required, the place of the use, the specific characteristics of the facility, and such other information as the Commission may, by rule or regulation, deem necessary in order to enable it to find that the utilization of special nuclear material will be in accord with the common defense and security and will provide adequate protection to the health and safety of the public. Such technical specifications shall be a part of any license issued.

In 10 CFR 50.36, the Commission established the regulatory requirements related to TS content. In doing so, the Commission emphasized matters related to the prevention of accidents and the mitigation of the consequences of accidents. As recorded in the Statements of Consideration, "Technical Specifications for Facility Licenses; Safety Analysis Reports" (33 FR 18610, December 17, 1968), the Commission noted that applicants are expected to incorporate into their TS "those items that are directly related to maintaining the integrity of the physical barriers designed to contain radioactivity." In 10 CFR 50.36(c), the NRC requires the TS for utilization facilities to contain (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements; (4) design features; and (5) administrative controls.

In 10 CFR 50.36(c)(2)(ii), the NRC requires the TS to include an LCO for each item that meets one or more of the following four criteria:

- "Criterion 1. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary."

- "Criterion 2. A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier."

- "Criterion 3. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that

either assumes the failure of or presents a challenge to the integrity of a fission product barrier."

- "Criterion 4. A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety."

Regulatory Guidance

In 1992, the NRC issued standard TS (STS) to clarify the content and format of requirements necessary to ensure the safe operation of nuclear power plants. These STS were developed from the results of the TS improvement program in accordance with 10 CFR 50.36; the Commission's "Proposed Policy Statement on TS Improvements for Nuclear Power Reactors," published on February 6, 1987 (52 FR 3788) (interim policy statement); and SECY-93-067, "Final Policy Statement on TS Improvements for Nuclear Power Reactors," published on July 22, 1993 (58 FR 39132) (final policy statement). The NRC published major revisions to the STS in 1995 (Revision 1), 2001 (Revision 2), and 2004 (Revision 3).

The STS for boiling-water reactors (BWRs) are in the two NRC documents listed below.

- NUREG–1433, "Standard Technical Specifications, General Electric Plants (BWR/4)," Volumes 1 and 2

- NUREG–1434, "Standard Technical Specifications, General Electric Plants (BWR/6)," Volumes 1 and 2

For each document, Volume 1 contains the TS and Volume 2 contains the associated TS bases. The STS include the bases for safety limits, limiting safety system settings, LCOs, and associated action and surveillance requirements.

The STS reflect the results of a detailed review of the application of the Commission's interim policy statement criteria to generic system functions. The NRC published these results—known as the split report (Agencywide Document Access and Management System (ADAMS) Accession No. ML11264A057)—in a May 9, 1988, letter from T. E. Murley (NRC) to the nuclear steam supply system (NSSS) vendor-owner groups (e.g., W. S. Wilgus of the Babcock & Wilcox Owners Group and R. F. Janecek of the BWR Owners' Group). The split report provides the results of the NRC staff's review of the NSSS vendor-owner groups' application of the Commission's interim policy statement criteria to the existing STS (e.g., NUREG–0123 for General Electric Plants) LCOs. The STS also reflect the results of extensive discussions about various drafts of the STS to ensure that the application of TS criteria will consistently reflect detailed system configurations and operating characteristics for all reactor designs. Therefore, the STS bases provide abundant information about the extent to which the STS reflect requirements that are necessary to protect public health and safety.

In the final policy statement, the Commission expressed the view that satisfying the guidance in the policy statement also satisfies Section 182a of the Act and 10 CFR 50.36. The final policy statement describes the safety benefits of the STS. It also encourages licensees to use the STS as the basis for license amendments to partially or completely convert existing TS requirements to improved TS based on the STS.

The format and content of the PTS and bases in a COL application referencing a certified design should be based on the GTS and bases for the certified design. PTS and bases may

- include appropriate plant-specific departures from the referenced certified GTS and bases when warranted.

16.4 Technical Evaluation

As documented in NUREG–1966 and NUREG-1966, Supplement 1, NRC staff reviewed and approved Chapter 16 of the certified ESBWR DCD. The staff reviewed Chapter 16 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to the review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to this chapter.

The staff reviewed the PTS and bases, which are in Part 4 of the Fermi 3 COL application. FSAR Chapter 16, which is in Part 2 of the COL application, incorporates by reference the latest revision to ESBWR DCD Section 16.0, "Introduction." This DCD section contains guidance (i.e., reviewer's notes) for providing site-specific information to resolve the COL items, which are indicated by brackets in DCD Chapters 16 and 16B, the GTS and bases. The COL items are listed in Section 16.2 Table 16.1 of this SER. The PTS and bases contain the latest revision of the GTS and bases and the site-specific information in accordance with COL Item 16.0-1-A. The GTS and bases and the inserted site-specific information form a complete set of PTS and bases for staff review and approval. Part 4 of the COL application also describes and justifies the proposed RM for each COL item.

The staff confirmed that the PTS and bases, as presented in Part 4 of the COL application, incorporate the GTS and bases. The staff also reviewed the site-specific information provided in accordance with COL Item 16.0-1-A, as listed in Section 16.2 Table 16.1 of this report. The staff focused the COL application review on the completion of the site-specific information in the PTS and bases.

Completion of the ESBWR DCR

NRC staff separately reviewed the GTS and bases on Docket No. 052-010 as part of the ESBWR DC review. The staff's review of the GTS and bases is documented in Chapter 16 of the ESBWR DC FSER. Because the staff's DC review of the GTS and bases applies to the PTS and bases, the staff did not review information in the PTS and bases that is identical to information in the GTS and bases.

Completion of the staff's technical evaluation of the PTS and bases was contingent on NRC approval and certification of the ESBWR design and publication of the ESBWR DCR. Consequently, the staff verified that except for the COL items, the PTS and bases are identical to the GTS and bases that have received final NRC approval. This technical evaluation thereby incorporates the resolution of all issues related to the GTS and bases that remain open at the time of the Fermi 3 COL application.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

Resolution of COL Items Listed in Table 16.1

Detroit Edison proposed to resolve each COL item using one of the three options permitted by DC/COL-ISG-08: (1) Option 1, a site-specific value or site-specific information; (2) Option 2, a useable value or useable information that is bounding to the site-specific value or information; or (3) Option 3, a staff-approved administrative control TS requiring the use of an NRC-approved methodology to determine the site-specific value or information and the establishment of a document for recording the site-specific value or information.

Option 1. The staff determines whether the site-specific information provided under Option 1 is acceptable by verifying that the information is accurate and useable for unit operation. To make this determination, the staff (1) compares the information with the FSAR and the conditions in the associated reviewer's note in ESBWR DCD Section 16.0; and (2) reviews the justification included in the COL application. The following are the COL items resolved using Option 1:

- Optional provisions that would provide additional operational flexibility. The associated reviewer's notes for such COL items require the COL applicant to provide additional site-specific justifications in order to incorporate the operational flexibility in the PTS. These COL items are indicated in Table 16.1 by the phrase "(Operational flexibility not adopted)."

  – action and surveillance requirements for slow control rods (COL Items 3.1.3-1, 3.1.3-2 and 3.1.4-1)

  – action requirements for an out-of-limit sodium pentaborate concentration in the standby liquid control system accumulator (COL Item 3.1.7-1)

  – exclusion of instrumentation components from response time testing (COL Items 3.3.1.1-2, 3.3.1.2-1, 3.3.1.4-2, 3.3.1.5-2, 3.3.5.1-2, 3.3.5.2-1, 3.3.5.3-2, 3.3.5.4-1, 3.3.6.1-2, 3.3.6.2-1, 3.3.6.3-2, 3.3.6.4-1, 3.3.7.1-3, and 3.3.7.2-2)

  – specifying a minimum critical power ratio (MCPR) penalty in lieu of requiring an operable main turbine bypass system (COL Items 3.7.4-1 and 5.6.3-1)

  – specifying a surveillance frequency of greater than 31 days for cycling turbine bypass valves (COL Item 3.7.4-2)

  – specifying an MCPR penalty in lieu of requiring operable selected control rod run-in (SCRRI)/selected rod insert (SRI) functions (COL Item 3.7.6-1)

  For these COL items, Detroit Edison elected to omit these allowances from the PTS. In each case, the resulting specification is more restrictive on unit operation than would be allowed by the omitted provision. Therefore, the resolution of these COL items is acceptable.

- Provisions related to protections against hazardous chemicals (COL Items 3.3.7.1-2, 3.3.7.2-1, 3.7.2-1, and 5.5.12-1). Detroit Edison did not adopt these optional provisions based on the resolution of Request for Additional Information (RAI) 2.2.3-5, as discussed in Chapter 2 of this safety evaluation report (SER), and the evaluation of hazardous chemicals in FSAR Section 6.4.5. Therefore, these COL items are resolved.

- Unit staff minimum qualification standards (COL Item 5.3.1-1) in GTS 5.3.1. Detroit Edison resolved this item in accordance with the reviewer's note in DCD Section 16.0, Table 16.0-1-A, by specifying the use of an overall qualification statement referencing an American National Standards Institute (ANSI) standard acceptable to the NRC staff, as follows:

  GTS 5.3.1 Each member of the unit staff shall meet or exceed the minimum qualifications of [Regulatory Guide 1.8, Revision 3, 2000, or more recent revisions, or ANSI Standard acceptable to the NRC staff]. [The staff not covered by Regulatory Guide 1.8 shall meet or exceed the minimum qualifications of Regulations, Regulatory Guides, or ANSI Standards acceptable to NRC staff].

  PTS 5.3.1 Each member of the unit staff shall meet or exceed the minimum qualifications of Regulatory Guide 1.8, Revision 3, 2000, with the following exception:

  a. During cold license operator training prior to Commercial Operation, the Regulatory Position C.1.b of Regulatory Guide 1.8, Revision 2, 1987, applies. Cold license operator candidates meet the training elements defined in ANS/ANSI 3.1-1993 but are exempt from the experience requirements defined in ANS/ANSI 3.1-1993.

  The proposed minimum qualification standards reference Regulatory Guide (RG) 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," Revision 3, issued May 2000; and American Nuclear Society (ANS)/ANSI 3.1-1993, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants," which are acceptable to the NRC staff. RG 1.8 will cover all Fermi 3 staff, so the second bracketed sentence is omitted. Therefore, the resolution of this COL item is acceptable.

- Guidance documents for written procedures (COL Items 5.4.1-1 and 5.4.1-2) in GTS 5.4.1. In PTS 5.4.1, Detroit Edison retained the GTS bracketed references to Appendix A to RG 1.33, Revision 2, "Quality Assurance Program Requirements (Operation)," issued February 1978 and Generic Letter 82-33, "Supplement 1 to NUREG-0737—Emergency Response Capabilities," dated December 17, 1982, which are appropriate for Fermi 3. Therefore, the resolution of these COL items is acceptable.

- Containment leakage rate-testing program exceptions to RG 1.163, "Performance-Based Containment Leak-Test Program," (COL Item 5.5.9-1) in GTS 5.5.9.a. In PTS 5.5.9.a, Detroit Edison omitted the GTS 5.5.9.a bracketed placeholder for exceptions because Detroit Edison did not propose any exceptions for Fermi 3. Therefore, the resolution of this COL item is acceptable.

- Annual radiological environmental operating report allowance for multiple-unit stations to submit a single report (COL Item 5.6.1-1) and the report format (COL Item 5.6.1-2) in GTS 5.6.1. In accordance with the reviewer's note in DCD Section 16.0, Table 16.0-1-A, Detroit Edison retained in PTS 5.6.1 the GTS bracketed note (without the brackets) allowing a single report to be submitted for a multiple-unit station. Detroit Edison also

retained (without the brackets) the GTS bracketed phrase on the report format: "[in the format of the table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979]." This information applies to Fermi 3 and is acceptable to the staff. Therefore, the resolution of these COL items is acceptable.

- Radioactive effluent release report allowance for multiple-unit stations to submit a single report (COL Item 5.6.2-1) in GTS 5.6.2. In accordance with the reviewer's note in DCD Section 16.0, Table 16.0-1-A, Detroit Edison retained in PTS 5.6.2 the GTS bracketed note (without the brackets) allowing a single report to be submitted for a multiple-unit station. This information applies to Fermi 3 and is acceptable to the staff. Therefore, the resolution of this COL item is acceptable.

- References to any additional individual specifications that address core operating limits (COL Item 5.6.3-2) in GTS 5.6.3. Detroit Edison omitted the GTS bracketed placeholder in PTS 5.6.3 because no additional plant-specific specifications address core operating limits. The generic DCD Table 16.0-1-A reviewer's note for COL Item 5.6.3-2 erroneously indicates that this COL item also includes in PTS 5.6.3.b the associated NRC-approved methods used to determine the core operating limits. However, all of the required methods for Fermi 3 are listed in GTS 5.6.3.b, which the PTS incorporate by reference. No additional methods need to be referenced. Therefore, the resolution of this COL item is acceptable.

- Description of site location (COL Item 4.1-1) in GTS 4.1. The staff verified that the PTS 4.1 description of the Fermi 3 site location is accurate. Therefore, the resolution of this COL item is acceptable.

- Non-licensed operator manning requirements (COL Item 5.2.2-1) in GTS 5.2.2. The reviewer's note in DCD Section 16.0, Table 16.0-1-A requires the COL applicant to determine whether the unit will be on a multi-unit site and clarifies that "two unit sites with both units shutdown or defueled require a total of three non-licensed operators for the two units." Because Fermi 3 is a stand-alone ESBWR unit, Detroit Edison omitted the bracketed statement and retained the existing GTS 5.2.2.a unbracketed statement in PTS 5.2.2.a, which applies to both single-unit and two-unit sites. Therefore, the resolution of this COL item is acceptable.

- Outdoor liquid storage tank radioactivity monitoring program (COL Item 5.5.6-1). GTS 5.5.6, "Explosive Gas and [Storage Tank] Radioactivity Monitoring Program," contains bracketed provisions and a surveillance program for unprotected outdoor liquid radioactive waste storage tanks. The reviewer's note in DCD Section 16.0, Table 16.0-1-A requires the COL applicant to incorporate the GTS 5.5.6 bracketed requirements in PTS 5.5.6, if the site design includes such storage tanks. Because Fermi 3 does not include such storage tanks, PTS 5.5.6 omits these bracketed requirements. Therefore, the resolution of this COL item is acceptable.

- Battery cell parameters (COL Items 3.8.1-4, 3.8.3-3, and 5.5.10-1). The applicant has provided the site-specific values for battery parameters based on the BAE 2V-24OPzS-3000 battery manufacturer's recommendations, as in the following table:

Table 16.2. Battery Cell Parameters

COL Item	Location	Parameter/Information	PTS Value
3.8.1-4	"SR" section of bases for PTS SR 3.8.1.1	Minimum float voltage for a battery cell and for a battery with 120 cells	• 2.22 volts per cell (Vpc) • 266.4 V at 25 °C (77 °F) at the battery terminals
		Location for monitoring battery temperature for voltage compensation	Battery terminals
3.8.3-3	"Background" section of bases for PTS 3.8.3	Nominal specific gravity value of a fully charged battery cell	1.240
		Number of battery cells in battery	120
		Approximate open circuit voltage for a battery with 120 cells and a battery cell voltage corresponding to the nominal specific gravity value of a fully charged battery cell	• 249.6 V • ≥ 2.07 Vpc to 2.09 Vpc
		Time period that a fully charged battery cell will maintain its capacity without further charging	30 days
3.8.3-3	"Background" section of bases for PTS 3.8.3	Battery cell float voltage (over-potential) for optimal long-term performance and its benefit	• 2.22 to 2.24 Vpc at 25 °C (77 °F) • limits the formation of lead sulfate and self-discharge
		Nominal float voltage for a battery cell and for a battery with 120 cells	• 2.23 Vpc at 25 °C (77 °F) • 267.6 V
	PTS 3.8.3: • Condition A • Required Action A.3 • Bases for Actions A, B, C, and G • Condition G • SR 3.8.3.2 and bases • SR 3.8.3.5 and bases	Minimum battery cell float voltage	2.09 V
	SR 3.8.3.2 bases and SR 3.8.3.5 bases	Nominal float voltage for a battery cell and for a battery with 120 cells	• 2.23 Vpc at 25 °C (77 °F) • 267.6 V
		Battery cell float voltages addressed by PTS 5.5.10	< 2.13 Vpc but > 2.09 Vpc at 25 °C (77 °F)
		Short-term absolute minimum battery cell voltage	2.09 Vpc
	SR 3.8.3.4 bases	Battery pilot cell electrolyte design minimum temperature	16 °C (60 °F)
5.5.10-1	5.5.10.a	Minimum battery cell float voltage	< 2.13 V

The applicant completes the bases for PTS surveillance requirement (SR) 3.8.1.1, by replacing the GTS bracketed value with the plant-specific value of 2.22 volts per cell (Vpc) at 25 degrees Celsius (C) (77 degrees Fahrenheit [F]) for the minimum float voltage. This value is based on the battery manufacturer BAE's recommendation for the optimum long-term battery performance by limiting the formation of lead sulfate and self-discharge. Therefore, the staff found the minimum float voltage of 2.22 Vpc at 25 degrees C for the optimum long-term battery performance acceptable. The staff found that the proposed location of "battery terminals" for monitoring the battery temperature for voltage compensation is acceptable because it is consistent with the battery manufacturer BAE's recommendation. Therefore, COL Item 3.8.1-4 is resolved.

The applicant completed Actions A and G, SR 3.8.3.2, and SR 3.8.3.5 and the associated bases of PTS 3.8.3, "Battery Parameters," by replacing the GTS bracketed values with the site-specific value of 2.09 volts (V) as the minimum battery cell float voltage. This value is based on the manufacturer BAE's recommendation. The applicant also replaced other bracketed information with appropriate site-specific values. The staff found that a battery cell with a flooded lead-acid construction has a nominal specific gravity of 1.240. This specific gravity corresponds to a battery cell that has an open circuit voltage of 2.07 to 2.09 Vpc for a 120-cell battery at 25 degrees C (77 degrees F). Per the manufacturer's instruction, the battery cell will maintain its capacity for 30 days without further charging once it is fully charged with its open-circuit voltage greater than or equal to 2.07 to 2.09 Vpc. The staff calculated the open-circuit voltage to be 2.085 Vpc (1.240 + 0.845), using the Institute of Electrical and Electronics Engineers (IEEE) Standard (Std) 450–2010, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," which is consistent with the manufacturer's recommendation. NRC staff found the site-specific value of 2.09 Vpc for the short-term absolute minimum battery cell float voltage and the values of other associated parameters, such as the specific gravity and duration of capacity retention, to be acceptable. Therefore, COL Item 3.8.3-3 is resolved.

The applicant completed PTS 5.5.10, "Battery Monitoring and Maintenance Program," which requires establishing a program that provides for battery restoration and maintenance, by replacing GTS bracketed values with site-specific values for a specified battery cell float voltage. Specifically, PTS 5.5.10.a states that the program must include "with battery cell float voltage < 2.13 V, actions to restore cell(s) to ≥ 2.13 V and perform SR 3.8.3.5." SR 3.8.3.5 verifies that each required battery-connected cell float voltage is ≥ 2.09 V. The value of 2.13 V for implementing programmatic actions for restoration and maintenance is based on the manufacturer's recommendation. The staff found that the value cell float voltage selected for the battery restoration and maintenance program to be consistent with IEEE Std 450–2010 and, therefore, acceptable. Therefore, COL Item 5.5.10-1 is resolved.

- Battery margin including the aging factor and state-of-charge uncertainty (COL Item 3.8.1-5). The applicant completed the "Background" section of the bases for PTS 3.8.1 by replacing the GTS bracketed value with the plant-specific value of 80 percent of the battery ampere-hour rating for the battery end-of-life capacity limit. This value is based on the battery manufacturer BAE's recommendation. The staff found this value acceptable because the battery sizing includes an aging factor of 125 percent that will provide a 100-percent design demand load with 80 percent of the battery ampere-hour rating, which is consistent with IEEE Std 485–2010, "IEEE

Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications," and IEEE Std 450–2010. Therefore, COL Item 3.8.1-5 is resolved.

- Battery margin including the aging factor and state-of-charge uncertainty (COL Item 3.8.3-4). The applicant completed PTS SR 3.8.3.6 by replacing the GTS bracketed value with the plant-specific value of a battery capacity greater than or equal to 80 percent of the manufacturer's ampere-hour rating, when subjected to a performance discharge test. This test determines the overall degradation of the battery from age and usage. The staff found that the battery capacity of 80 percent will meet 100-percent of the design demand loads, because the battery sizing includes an aging factor of 125 percent. The staff also found that the proposed value is consistent with IEEE Std 450 and IEEE Std 485, which recommend that the battery be replaced if its capacity is below 80 percent of the manufacturer's rating. Therefore, the proposed performance discharge test battery capacity acceptance criterion value of greater than or equal to 80 percent of the manufacturer's ampere-hour rating is acceptable. Thus, COL Item 3.8.3-4 is resolved.

- The applicant completed PTS 3.8.3 Conditions B, C, and G; Required Actions B.2 and C.2; the bases for Actions B, C, and G; and the bases for SR 3.8.3.1 by providing the float current acceptance criterion for verifying a fully charged battery (COL Item 3.8.3-1). In Item 21 of the Introduction to Part 4 of the COL application, Revision 2, the applicant states that the maximum float current value indicative of a fully charged battery is 30 amps, which is based on the "BAE battery manufacturer's recommended fully charged float current limits for the BAE 2V-24OPzS-3000 battery string." In RAI 16-2, the staff asked the applicant to provide supporting documentation for the float current value of 30 amps for a fully charged battery. Additionally, the staff asked the applicant to clarify the justification for the float current value of 30 amps, which the COL application states is based on the manufacturer's recommended fully charged float current limit for the BAE 2V-24OPzS-3000 battery string. In an apparent conflict with this statement, the "Surveillance Requirements" section of the bases for PTS 3.8.3 states that the 30-amps value is based on returning the battery to a 95-percent charge. In response, the applicant states the following.

  > Detroit Edison intends to use batteries manufactured by BAE in the 250 V Safety-Related DC [direct current] System. For the selected batteries, a 30 amp battery float current is based on returning the battery to 95% charge and assumes a 5% design margin to account for uncertainties in the use of float current to measure the state of charge of the battery. These values are recommended by the battery manufacturer and are used to complete the GTS bracketed items in the Fermi 3 TS Bases for TS 3.8.3.
  >
  > The method of sizing the Safety-Related 250 V batteries is described in Section 8.3.2.1.1 of Revision 7 of the ESBWR DCD [Tier 2], which requires that the batteries be sized for DC [direct current] load in accordance with IEEE Standard 485 and include margin to compensate for uncertainty in determining the battery state of charge. The margin associated with using battery float current to indicate battery state of charge is incorporated into the design by adding the battery float current uncertainty to those margins specified in the battery sizing methods described in IEEE Standard 485.

> In summary, a battery is considered to be operable when the battery float current is less than or equal to 30 amps. Battery operability is defined as being capable of performing its specified safety function (i.e., supplying the required loads for the required time period).
>
> It is recognized that in using battery float current to determine the state of charge introduces uncertainty compared to other methods, such as specific gravity. The battery manufacturer has recommended an uncertainty value of 5%. This means that when a 30 amp battery float current is measured, the battery is at least 95% charged. The system design accounts for this uncertainty by requiring that it be included in the method for determining required battery capacity, in addition to the uncertainties considered by the methods described in IEEE [Standard] 485 (i.e., a 5% larger battery capacity is specified in the design, for a given battery load, because battery float current is used in determining battery state of charge in lieu of other methods).

The applicant also revised the justification in renumbered Item 20 in the Introduction to Part 4 of COL application Revision 3 to state the following: "Values for battery float current acceptance criteria and battery capacity margin for state of charge [uncertainty] are based on the battery manufacturer's recommendations." The staff found that the applicant's response provides an appropriate clarification, because the response also includes a document from the battery manufacturer that confirms the acceptability of the use of a float current of 30 amps or less to ensure a charged condition of 95 percent or greater for the BAE 2V-24OPzS-3000 battery. Therefore, COL Item 3.8.3-1 and RAI 16-2 are resolved.

- The applicant completed COL Item 5.5.11-1 regarding PTS 5.5.11, "Setpoint Control Program," by replacing the bracketed information in paragraph b with a reference to the NRC-approved setpoint methodology, NEDE-33304P-A, "GEH ESBWR Setpoint Methodology," Revision 4, issued May 2010, which was approved as part of the ESBWR DC review as documented in NUREG–1966, Section 7.1.4. Specifically, paragraph b states the following:

  > The Limiting Trip Setpoint (LTSP), Nominal Trip Setpoint ($NTSP_F$), Allowable Value (AV), As-Found Tolerance (AFT), and As-Left Tolerance (ALT) for each Technical Specification required automatic protection instrumentation function shall be calculated in conformance with the instrumentation setpoint methodology previously reviewed and approved by the NRC in NEDE-33304P-A, "GEH ESBWR Setpoint Methodology," Revision 4, dated May 2010, (Public Version ADAMS Accession No. ML101450251), and the conditions stated in the associated NRC safety evaluation, Letter to GEH from NRC, "Final Safety Evaluation Report for the Economic Simplified Boiling Water Reactor Design," dated March 9, 2011, (ADAMS Accession Nos. ML110050215, specifically Chapter 7 FSER ML110030049 and Chapter 16 FSER ML110030064).

  Therefore, COL Item 5.5.11-1 is resolved.

Option 2. The staff determines whether the site-specific information provided under Option 2 is acceptable by verifying that the information is bounding and useable for unit operation. This

verification is based on (1) a comparison of the information with the FSAR and the conditions in the associated reviewer's note in DCD Section 16.0, Table 16.0-1-A; and (2) a review of the justification in the COL application that includes how the bounding value was determined. The applicant selected Option 2 for resolving the following COL items:

- Battery charger surveillance test duration (COL Item 3.8.1-1). The applicant states in Item 19 of the Introduction to Part 4 of the COL application that the proposed minimum test duration of 8 hours for battery charger testing in PTS SR 3.8.1.2 is bounding based on the GUTOR manufacturer's recommendations for battery charger test duration. An 8-hour time period is sufficient for the charger temperature to be stabilized and maintained for at least 2 hours. The staff concluded that 8 hours is a useable bounding value for the battery charger test duration. Therefore, the proposed resolution of COL Item 3.8.1-1 is acceptable.

- Requirements related to the reactor coolant system pressure and temperature (P/T) limits report (PTLR) (COL Items 1.1-1, 3.4.4-1, 3.4.4-2, 3.4.4-3, and 5.6.4-1). Revision 3 of the Fermi 3 COL application identified NEDC-33441P,"GE Hitachi Nuclear Energy Methodology for the Development of ESBWR Reactor Pressure Vessel Pressure-Temperature Curves," Revision 4, issued in December 2010, as the document that contains the analytical methods used to determine the reactor coolant system P/T limits. In a letter dated March 3, 2011 (ADAMS Accession No. ML110670090), the applicant submitted Revision 5 of NEDC-33441P (Proprietary version) and NEDO-33441 (Non-Proprietary version of the PTLR). The staff's evaluation of the P/T limits and P/T methodology for Fermi 3 is in Section 5.3.2 of this SER. Based on the staff's determination that the P/T limits in NEDC-33441P are useable bounding values for Fermi 3, the applicant completed the PTLR-related COL Items by (1) removing brackets from around PTS 5.6.4; (2) replacing the associated bracketed placeholder for the P/T methodology in GTS 5.6.4.b with a reference to NEDC-33441P Revision 5 issued in February 2011, in PTS 5.6.4.b and in the "References" section of the bases for PTS 3.4.4; and (3) removing the brackets from "[PTLR]" in PTS Sections 1.1 and 3.4.4. Referencing Revision 5 of NEDC-33441P in the PTS and bases is acceptable because it describes the NRC-approved P/T methodology and bounding P/T limits that are applicable to Fermi 3. Therefore, the PTLR-related COL items are resolved in accordance with Option 2. Verification that a future revision of the COL application incorporates these changes was tracked as Confirmatory Item 16-1 in the advanced final SER. The staff verified that Revision 4 of the COL application included the described changes. Therefore, Confirmatory Item 16-1 is resolved.

- Minimum control rod drive scram accumulator pressure (COL Items 3.1.5-1 and 3.9.5-1). The applicant proposes to replace the bracketed information in the bases for SR 3.1.5.1 as follows:

  The GTS SR 3.1.5.1 bases state the following:

  > The minimum accumulator pressure of [12.76 MPaG (1850 psig) is well below the expected pressure of 14.82 MPaG (2150 psig) (Ref. 2)].

  The PTS SR 3.1.5.1 bases, instead state the following:

  > The minimum accumulator pressure of 12.75 MPaG (1849 psig) reflects a bounding value based on the ABWR CRD HCU accumulator minimum

pressure value. Using the ABWR minimum pressure value is bounding and thereby justified based on:

a) ESBWR frictional pressure loss is similar to the ABWR design,

b) ESBWR control rod is lighter in weight than the ABWR control rod,

c) ESBWR normal reactor pressure on scram initiation is similar to ABWR, and

d) Mechanical losses should be bounded, since the basic mechanical designs are the same.

For the reasons stated above in the proposed bases for PTS SR 3.1.5.1, the staff concluded that the value of 12.75 megapascals gauge (MPaG) (1,849 pounds per square inch gauge [psig]) is a useable bounding value for the minimum accumulator pressure and is therefore acceptable as a control rod operability criterion in PTS 3.1.5 and PTS 3.9.5. Because the "expected pressure" value is not a criterion for control rod operability, stating it in the bases for PTS SR 3.1.5.1 is not necessary. Therefore, the proposed resolution of COL Items 3.1.5-1 and 3.9.5-1 is acceptable.

Option 3. The staff determines whether the site-specific information provided under Option 3 is acceptable by verifying that the PTS administrative program for controlling the relocated information (1) conforms to the GTS, if the GTS contains such a program, or conforms to applicable regulatory requirements; (2) specifies using an NRC-approved methodology for determining site-specific information to be maintained outside of the PTS; (3) specifies establishing a document to record the most recent version of the relocated information; (4) specifies controlling changes to the specified document in accordance with 10 CFR 50.59, "Changes, Tests and Experiments," and the specified NRC-approved methodology; and (5) specifies the schedule for providing the NRC with updates to the specified document. The staff also verifies that the PTS include appropriate references to the proposed PTS administrative program, if they are needed to establish a connection between the relocated information and the associated individual PTS requirements.

Detroit Edison does not need to use Option 3 to resolve any COL items, because the two areas of site-specific information to which Option 3 would potentially apply were resolved as part of the ESBWR DCD. These areas are (1) instrumentation allowable values for as-found trip settings, and (2) the list of required instrumentation functions for post accident monitoring (PAM). The GTS specifies instrumentation allowable values by (a) removing all instrumentation settings and (b) specifying a setpoint control program that meets the acceptance criteria stated above for a PTS administrative program under Option 3. The only COL information needed to complete the PTS instrumentation requirements is in PTS 5.5.11. COL Item 5.5.11-1 guidance in Table 16.0-1-A of DCD Section 16.0 states that a COL applicant may complete this item by providing the reference to the NRC-approved setpoint methodology. As described above, the applicant resolved COL Item 5.5.11-1 using Option 1. Detroit Edison incorporated GTS 5.5.11 by reference into the PTS. Because the ESBWR DCD references RG 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," Revision 4, issued in June 2006, the DC applicant recognized that the list of PAM instrumentation functions specified in GTS 3.3.3.2, "PAM Instrumentation," could not be finalized before the issuance of a COL. Therefore, the GTS include Specification 5.5.14, "PAM Instrumentation Program," which requires a program to provide controls to establish accident-monitoring instrumentation required

by GTS 3.3.3.2 to include all Type A, B, and C functions as determined by RG 1.97, Revision 4. Detroit Edison incorporated GTS 5.5.14 by reference into the PTS. Therefore, the staff found that PTS 5.5.11 and 5.5.14 are acceptable.

Based on the above information, COL Item 16.0-1-A is resolved. The staff determined that the Fermi 3 COL application contains no Tier 1, Tier 2*, or Tier 2 departures from the ESBWR generic DCD that affect the PTS and bases. The COL application also contains no issues concerning information outside of the generic DCD that need to be resolved before completing the review of the PTS and bases.

16.5 Post Combined License Activities

There are no post COL activities related to this chapter.

16.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966 and NUREG-1966, Supplement 1. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this chapter. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this chapter that were incorporated by reference have been resolved.

In addition, the staff compared the additional COL site-specific information (site-specific TS) in the application to the relevant NRC regulations, the acceptance criteria defined in NUREG-0800, Section 16.0, and other regulatory guidance. The staff's evaluation found the site-specific information acceptable and the PTS and bases complete and adequate for use in the operation of Fermi 3.

Therefore, the staff concluded that the PTS and bases satisfy 10 CFR 50.36; 10 CFR 50.36a; 10 CFR 52.79(a)(30); and Section IV.A.2, paragraphs c and e, of 10 CFR Part 52, Appendix E.

17.0 QUALITY ASSURANCE

This chapter discusses the Quality Assurance (QA) Program, including the following:

- QA for design, fabrication, construction, testing, and operation
- Reliability Assurance Program (RAP)
- Maintenance Rule (MR) Program

17.0.1 Introduction

The QA Program for design, fabrication, construction, testing, and operation; the RAP; and the MR Program are discussed in this chapter.

17.0.2 Summary of Application

Section 17.0 of the Fermi 3 combined license (COL) Final Safety Analysis Report (FSAR), Revision 7, incorporates by reference Section 17.0 of the certified Economic Simplified Boiling-Water Reactor (ESBWR) Design Control Document (DCD), Revision 10, referenced in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix E, "Design Certification Rule for the Economic Simplified Boiling-Water Reactor. In addition, in FSAR Section 17.0, the applicant provides the following:

Supplemental Information

- EF3 SUP 17.0-1

In Section 17.0 of the Fermi 3 COL FSAR the applicant provides supplemental information that states:

> The QAPD [Quality Assurance Program Description] applicable to the COL licensee is described in Section 17.5. The licensee's QAPD describes the basis of the program, its scope of activities, and the control of work performed by suppliers.

17.0.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor." In addition, the relevant requirements of the Commission regulations for QA during the design phase, and the associated acceptance criteria, are in Sections 17.1 and 17.5 of NUREG–0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)" the Standard Review Plan (SRP).

17.0.4 Technical Evaluation

As documented in NUREG–1966, the U.S. Nuclear Regulatory Commission (NRC) staff reviewed and approved Section 17.0 of the certified ESBWR DCD. The staff reviewed Section 17.0 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR

DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to this section.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

Supplemental Information

- EF3 SUP 17.0-1

In Section 17.0 of the FSAR, the applicant states:

> The QAPD applicable to the COL licensee is described in Section 17.5. The licensee's QAPD describes the basis of the program, its scope of activities, and the control of work performed by suppliers.

The staff's safety evaluation of Fermi 3 COL FSAR Section 17.0 is in Section 17.5 of this Safety Evaluation Report (SER).

The staff reviewed Supplemental Information EF3 SUP 17.0-1 and determined that it adequately references Section 17.5 of the Fermi 3 COL FSAR for a description of the basis of the QA Program, its scope of activities, and the control of work performed by suppliers.

17.0.5 Post Combined License Activities

There are no post COL activities related to this section.

17.0.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the Fermi 3 COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference are resolved.

In addition, the staff compared the additional COL supplemental information in the application to the relevant NRC regulations, the guidance in Sections 17.1 and 17.5 of NUREG–0800, and other NRC regulatory guides (RGs). The staff's technical evaluation of Supplemental Information EF3 SUP 17.0-1 is part of the evaluations in Section 17.5 of this SER. The staff's review finds that the applicant has adequately addressed the supplemental information by referencing FSAR Section 17.5.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

17.1 Quality Assurance During Design

17.1.1 Introduction

This FSAR section addresses the QA Program related to the design phase, including the preparation of the COL application and site-specific design activities.

17.1.2 Summary of Application

Section 17.1 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 17.1 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 17.1, the applicant provides the following:

Supplemental Information

- EF3 SUP 17.1-1

In FSAR Section 17.1, the applicant provides supplemental information that states:

> QA applied during COL application preparation and site specific design activities is addressed in Section 17.5.

17.1.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for QA during the design phase, and the associated acceptance criteria, are in Sections 17.1 and 17.5 of NUREG–0800.

17.1.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 17.1 of the certified ESBWR DCD. The staff reviewed Section 17.1 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to this section.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

Supplemental Information

- EF3 SUP 17.1-1

In FSAR Section 17.1, the applicant provides supplemental information that states:

> QA applied during COL application preparation and site specific design activities is addressed in Section 17.5.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

The staff reviewed Supplemental Information EF3 SUP 17.1-1 and determined that it adequately references Section 17.5 of the Fermi 3 COL FSAR for a description of the QA Program applied during the design phase, including the COL application preparation and site-specific design activities.

17.1.5 Post Combined License Activities

There are no post COL activities related to this section.

17.1.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the Fermi 3 COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference are resolved.

In addition, the staff compared the additional COL supplemental information in the application to the relevant NRC regulations, the guidance in Sections 17.1 and 17.5 of NUREG–0800, and other NRC RGs. The staff's review concludes that the applicant has adequately addressed the supplemental information by referencing FSAR Section 17.5.

17.2 Quality Assurance During Construction and Operations

17.2.1 Introduction

This FSAR section addresses the QA Program during the construction and operations phases of the plant, including adapting the design to plant-specific implementation.

17.2.2 Summary of Application

Section 17.2 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 17.2 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 17.2, the applicant provides the following:

COL Items

- EF3 COL 17.2-1-A — QA Program for the Construction and Operations Phases
- EF3 COL 17.2-2-A — QA Program for Design Activities

In Section 17.2 of the FSAR, the applicant states:

> The licensee's Quality Assurance Program in place during the construction and operations phases, including adapting the design to specific plant implementation, is described in Section 17.5.

17.2.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for QA during the design phase, and the associated acceptance criteria, are in Sections 17.2 and 17.5 of NUREG–0800.

17.2.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 17.2 of the certified ESBWR DCD. The staff reviewed Section 17.2 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to this section.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

- EF3 COL 17.2-1-A — QA Program for the Construction and Operations Phases
- EF3 COL 17.2-2-A — QA Program for Design Activities

The licensee's QA Program in place during the construction and operations phases, including adapting the design to specific plant implementation, is described in Section 17.5.

The staff reviewed Supplemental Information EF3 COL 17.2-1-A and EF3 COL 17.2-2-A to determine whether they meet NRC regulations by following the guidance in SRP Section 17.5. SRP Section 17.5 provides an outline of a QA Program acceptable to the staff for the design certification, early site permit (ESP), COL, construction permit, and operating license applicants. The staff developed SRP Section 17.5 using ASME NQA-1–1994, "Quality Assurance Requirements for Nuclear Facility Applications," supplemented by additional regulatory and industry guidance for nuclear operating facilities. SRP Section 17.5 also addresses additional QA requirements in 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion 1 (GDC 1), "Quality standards and records"; and 10 CFR 50.34(f)(3)(ii) and (iii). GDC 1 requires that a QA Program be established and implemented. 10 CFR 50.34(f)(3)(ii) and (iii) specify design and construction QA requirements that must be addressed in a QAPD. The staff's safety evaluation of Fermi 3 COL FSAR, Section 17.2 is in Section 17.5 of this SER. The staff determined that COL Items EF3 COL 17.2-1-A and EF3 COL 17.2-2-A adequately reference Section 17.5 of the Fermi 3 COL FSAR for a description of the QA Program applied during the design, construction, and operations phases, including adapting the design to specific plant implementation. The technical evaluations of COL items are in Subsection 17.5.4.21, "Additional Quality Assurance and Administrative Controls for the Plant Operational Phase," of this SER.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

17.2.5 Post Combined License Activities

There are no post COL activities related to this section.

17.2.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference are resolved.

In addition, the staff compared the additional information on COL items in the application to the relevant NRC regulations, the guidance in Sections 17.2 and 17.5 of NUREG–0800, and other NRC RGs. The staff's technical evaluation of COL Items EF3 COL 17.2-1-A and EF3 COL 17.2-2-A is in Section 17.5 of this SER. The staff's review finds that the applicant has adequately addressed the COL items by referencing FSAR Section 17.5.

17.3 Quality Assurance Program Description

17.3.1 Introduction

This FSAR section addresses the overall QA Program.

17.3.2 Summary of Application

Section 17.3 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 17.3 of the certified ESBWR DCD, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 17.3, the applicant provides the following:

COL Item

- EF3 COL 17.3-1-A Quality Assurance Program Document

In FSAR Section 17.3, the applicant states:

> The Quality Assurance Program Document applicable to the licensee is described in Section 17.5.

17.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for the QAPD, and the associated acceptance criteria, are in Sections 17.3 and 17.5 of NUREG–0800.

17.3.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 17.3 of the certified ESBWR DCD. The staff reviewed Section 17.3 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL

FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to the QAPD.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Item

- EF3 COL 17.3-1-A Quality Assurance Program Document

In FSAR Section 17.3, the applicant states:

> The Quality Assurance Program Document applicable to the licensee is described in Section 17.5.

This COL Item is addressed in Section 17.5 of this SER.

The staff reviewed COL Item EF3 COL 17.3-1-A to determine whether it meets NRC regulations by following the guidance in SRP Section 17.5. SRP Section 17.5 provides an outline of a QA Program acceptable to the staff for the design certification, ESP, COL, construction permit, and operating license applicants. The staff developed SRP Section 17.5 using ASME NQA-1–1994, supplemented by additional regulatory and industry guidance for nuclear operating facilities. SRP Section 17.5 also addresses additional QA requirements in 10 CFR Part 50, Appendix A, GDC 1 and 10 CFR 50.34(f)(3)(ii) and (iii). GDC 1 requires that a QA Program be established and implemented. 10 CFR 50.34(f)(3)(ii) and (iii) specify design and construction QA requirements that must be addressed in a QAPD. The staff determined that COL Item EF3 COL 17.3-1-A adequately references FSAR Section 17.5 for details of the QAPD.

17.3.5 Post Combined License Activities

There are no post COL activities related to this section.

17.3.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the QAPD that were incorporated by reference are resolved.

In addition, the staff compared the additional information on the COL item in the application to the relevant NRC regulations, the guidance in Section 17.3 of NUREG–0800, and other NRC RGs. The staff's technical evaluation of the QAPD is in Section 17.5 of this SER. The staff's review finds that the applicant has adequately addressed the COL item by referencing FSAR Section 17.5.

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

17.4 Reliability Assurance Program During Design Phase

17.4.1 Introduction

This FSAR section addresses the Commission's direction in the staff requirements memorandum (SRM) dated June 28, 1995, for Item E, "Reliability Assurance Program," of SECY-95-132, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems (RTNSS) in Passive Plant Designs," dated May 22, 1995. The RAP is implemented using the guidance in Item E of SECY-95-132. The purposes of the RAP are to provide reasonable assurances that:

- A plant is designed, constructed, and operated consistent with the assumptions and risk insights for the structures, systems, and components (SSCs) in the scope of the RAP.
- These SSCs do not degrade to an unacceptable level of reliability, availability, or condition during plant operations.
- The frequency of transients that challenge these SSCs is minimized.
- These SSCs function reliably when challenged.

The purposes of the RAP can be achieved by implementing the program in two stages. The first stage applies to RAP activities that occur before the initial fuel load and is referred to as the Design Reliability Assurance Program (D-RAP). The goal of the D-RAP is to ensure that the plant design meets the considerations identified earlier through the plant design, procurement, fabrication, construction, and preoperational testing activities and programs. The second stage applies to RAP activities for the operations phase of the plant's life cycle. The objective during this stage is to ensure that the reliability for the SSCs within the scope of the RAP is maintained during plant operations. Implementation of the D-RAP by the COL licensee is verified using the inspections, tests, analyses, and acceptance criteria (ITAAC) process, as well as inspections conducted during the detailed design and construction phases before initial fuel load.

17.4.2 Summary of Application

Section 17.4 of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Section 17.4 of the certified ESBWR DCD, Tier 2, Revision 10, referenced in 10 CFR Part 52, Appendix E. In addition, in FSAR Section 17.4, the applicant provides the following:

COL Item

- STD COL 17.4-1-A — Identifying Site-Specific Structures, Systems, and Components Within the Scope of the Reliability Assurance Program

In FSAR Section 17.4.1, "Introduction," the applicant states:

> There are no site specific SSCs within the scope of the RAP. The quality elements for all SSCs within the scope of the D-RAP are in accordance with the QAPD.

In FSAR Section 17.4.6, "SSC Identification/Prioritization," the applicant states:

The list of risk-significant SSCs will be confirmed via ITAAC (see DCD Tier 1, Table 3.6-1).

- STD COL 17.4-2-A Operation Reliability Assurance Activities

In FSAR Section 17.1, the applicant adds the following:

The objectives of reliability assurance during the operations phase are integrated into the Quality Assurance Program (Section 17.5), the MR Program (Section 17.6), and other operational programs. Specific reliability assurance activities are addressed within operational programs (e.g., maintenance rule, surveillance testing, inservice testing, inservice inspection, and quality assurance) and the maintenance programs.

The MR Program incorporates the following aspects of operational reliability assurance (refer to Section 17.6):

- Use of probabilistic risk assessment (PRA) importance measures, the expert panel process, and deterministic methods to determine the list of risk-significant SSCs.
- Evaluation and maintenance of the reliability of SSCs in the scope of the D-RAP.
- Monitoring the effectiveness of maintenance activities needed for operational reliability assurance.
- Classifying initially as high-safety-significant all SSCs that are in the scope of the D-RAP or applying expert panel review for any exceptions.
- Use of historical data and industry operating experience on equipment performance as available.
- Use of specific criteria to establish the level of performance or condition being maintained for SSCs within the scope of the MR Program; and use of monitoring to identify declining trends between surveillances and to minimize the likelihood of undetected performance or condition degradation to unacceptable levels, to the extent possible.
- Use of maintenance programs to determine the nature and frequency of maintenance activities to be performed on plant equipment, including SSCs within the scope of the MR Program.

In FSAR Section 17.4.9, “Operational Reliability Assurance Activities,” the applicant states:

Refer to Section 17.4.1 for the implementation of reliability assurance during the operations phase.

In FSAR Section 17.4.10, “Owner/Operator’s Reliability Assurance Program,” the applicant states:

The MR Program is described in Section 17.6. Refer to Section 17.4.1 for the implementation of reliability assurance activities.

17.4.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966.

In particular, the relevant guidance for the RAP, including the associated acceptance criteria, is in the following sources:

- Item E of SECY-95-132
- Section 17.4, "Reliability Assurance Program," of NUREG–0800

17.4.4 Technical Evaluation

As documented in NUREG–1966, NRC staff reviewed and approved Section 17.4 of the certified ESBWR DCD, Tier 2. The staff reviewed Section 17.4 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD appropriately represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that the information in the application and the information incorporated by reference address the relevant information related to the RAP.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

- STD COL 17.4-1-A

In Section 17.4.13 of the referenced ESBWR DCD Tier 2, COL Item 17.4-1-A states:

> The COL Applicant will identify the site-specific SSCs within the scope of the RAP, and describe the quality elements for developing and implementing the D-RAP (that is, Organization, Design Control, Procedures and Instructions, Records, Corrective Action, and Audit Plans) that will be applied prior to the initial fuel load (Subsection 17.4.1).

The applicant addresses this COL item in FSAR Section 17.4.1 by specifying the Commitment (COM 17.4-001) to identify the site-specific SSCs within the scope of the RAP, including a description of the quality elements for developing and implementing the D-RAP before the initial fuel loading.

Based on SECY-95-132 and SRP Section 17.4, the staff found that the applicant had not identified the site-specific RAP SSCs nor the quality elements for developing and implementing the D-RAP and therefore did not sufficiently address COL Item 17.4-1-A in the Fermi 3 COL FSAR, Revision 3. The ESBWR DCD, Tier 2 contains COL Item 17.4-1-A to ensure that COL applications referencing the ESBWR design contain a list of site-specific RAP SSCs (i.e., the RAP SSCs identified in Section 17.4 of the ESBWR DCD, Tier 2 and updated, as needed, using

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

COL site- and plant-specific information) and describe the quality elements for developing and implementing the plant-specific D-RAP. It is necessary to identify the site-specific RAP SSCs before the detailed design, procurement, fabrication, construction, inspection, and testing phases of the plant because the nonsafety-related RAP SSCs are subjected to the appropriate QA controls in accordance with SRP Section 17.5, SRP Acceptance Criterion V ("Nonsafety-Related SSC Quality Controls"). The quality elements of D-RAP are processes and controls implemented to ensure that the risk insights and key assumptions from probabilistic, deterministic, and other methods of analysis used to identify and quantify risk are consistent with the designed and constructed plant and that the list of RAP SSCs is appropriately developed, maintained, updated, and communicated to the appropriate organizations. These elements are applied during all plant design and construction activities before initial fuel load. The staff issued Request for Additional Information (RAI) 17.04-2 requesting the applicant to appropriately address COL Item 17.4-1-A in the Fermi 3 COL FSAR by identifying the site-specific RAP SSCs and describing the quality elements for developing and implementing the D-RAP.

In the response to RAI 17.04-2, dated May 25, 2011 (Agencywide Documents Access and Management System (ADAMS) ML11151A065), the applicant states that the list of SSCs within the scope of the RAP in ESBWR DCD Tier 2, Section 17.4 is incorporated by reference in FSAR Section 17.4, which includes all RTNSS SSCs identified in ESBWR DCD Tier 2, Appendix 19A. In addition, the applicant has reviewed the list of SSCs within the scope of the RAP that were incorporated by reference and concluded that no site-specific SSCs are within the scope of the RAP. In addition to the bounding treatment of PRA parameters, there are no departures from the standard design in any systems considered in the PRA model. Therefore, no site-specific design features affect the PRA because the boundary of the certified design covers all of the SSCs necessary for the PRA. Regarding RTNSS SSCs, the Fermi 3 COL FSAR incorporates by reference Appendix 19A of the ESBWR DCD Tier 2 with no departures or supplements. Furthermore, there are no site-specific nonsafety-related RTNSS systems beyond the scope of the DCD. Therefore, the applicant concludes that the list of SSCs within the scope of the RAP for Fermi 3 is identified in Section 17.4 of the ESBWR DCD Tier 2, which is incorporated by reference in the Fermi 3 COL FSAR.

The applicant also states that the QA controls for safety-related and nonsafety-related SSCs within the scope of the RAP are in accordance with the QAPD in FSAR Appendix 17AA. Part II of the QAPD provides the QA controls for safety-related SSCs. Part III of the QAPD provides the QA controls for nonsafety-related SSCs that significantly contribute to plant safety. In addition, the quality elements are incorporated by reference into Section 17.4.5 of the ESBWR DCD Tier 2. Furthermore, the applicant states that FSAR Section 17.4 will be revised to remove Commitment COM 17.4-001 and to include a statement that there are no site-specific SSCs within the scope of the RAP, and the quality elements for all SSCs within the scope of the RAP are in accordance with the QAPD.

The staff finds that the applicant's response has sufficiently addressed the issues raised in RAI 17.04-2. Also, the staff independently assessed the impact from the COL site- and plant-specific information on the list of SSCs within the scope of the RAP (i.e., additions or deletions to the list of SSCs within the scope of the RAP). The staff finds that the list of SSCs within the scope of the RAP for Fermi 3 is identified in Section 17.4 of ESBWR DCD Tier 2, which is incorporated by reference in the Fermi 3 COL FSAR. The applicant's proposed revision to Fermi 3 COL FSAR, Section 17.4, was tracked as Confirmatory Item 17.04-2. The NRC staff has verified that the applicant has incorporated the proposed changes into FSAR Section 17.4.

Based on the above discussion, Confirmatory Item 17.04-2 is closed and RAI 17.04-2 is resolved.

The applicant added the following sentence at the end of FSAR Section 17.4.6: "The list of risk-significant SSCs will be confirmed via ITAAC (see DCD Tier 1, Table 3.6-1)." The staff finds this statement acceptable because the D-RAP ITAAC in ESBWR DCD Tier 1, Table 3.6-1 will ensure that the design of SSCs within the scope of the RAP is consistent with the risk insights and key assumptions in the probabilistic, deterministic, and other methods of analysis used to identify and quantify risk. This includes applying quality elements of the D-RAP during design and construction activities to ensure that the list of RAP SSCs is appropriately developed, maintained, and communicated to the appropriate organizations.

- STD COL 17.4-2-A Operation Reliability Assurance Activities

In Section 17.4.13 of the referenced ESBWR DCD Tier 2, COL Item 17.4-2-A requires the applicant to provide a description of operational reliability assurance activities that meet the objectives of the RAP during the operations phase. In FSAR Subsection 17.4.1, the applicant describes an acceptable process for integrating the RAP into operational programs to meet the objectives of the RAP during the operations phase. The process involves integrating the RAP into the following operational programs:

(1) MR Program consistent with RG 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," with all RAP SSCs categorized as having high safety significance

(2) QA Program for safety-related SSCs established through Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 requirements

(3) QA Program controls for nonsafety-related RAP SSCs established in accordance with SRP Section 17.5, SRP Acceptance Criterion V

(4) Inservice inspection, inservice testing, surveillance testing, and maintenance programs for the RAP SSCs to maintain equipment performance consistent with the risk insights and key assumptions from probabilistic, deterministic, and other methods of analysis used to identify and quantify risk

The applicant also refers to FSAR Section 17.5 for the QA Program and Section 17.6 for the MR Program.

The second paragraph in Section 17.4.9 of the ESBWR DCD Tier 2 states that the COL holder is responsible for implementing operational reliability assurance activities. In the Fermi 3 FSAR, the applicant replaces the second paragraph of the DCD with the following sentence:

> Refer to Section 17.4.1 for the implementation of reliability assurance during the operations phase.

The staff finds this replacement acceptable because FSAR Section 17.4.1 describes how the applicant will implement the reliability assurance activities during the operations phase.

The fifth bullet in Section 17.4.10 of the ESBWR DCD Tier 2 describes the scope of the MR Program and states that it is the responsibility of the licensee. In the Fermi 3 FSAR, the applicant replaces the fifth bullet of the DCD with the following sentence:

> MR Program: The MR Program is described in Section 17.6.

The staff finds this replacement acceptable because FSAR Section 17.6 describes the applicant's MR Program, which meets the scope defined under the fifth bullet in DCD Section 17.4.10. The staff's technical evaluation of the MR Program is in Section 17.6 of this SER.

The last sentence in ESBWR DCD Tier 2, Section 17.4.10 states: "See Subsection 17.4.1 for COL information requirements." In the Fermi 3 FSAR, the applicant replaces the sentence of the DCD with the following sentence:

> Refer to Section 17.4.1 for the implementation of reliability assurance activities.

The staff finds this replacement appropriate.

Based on the above evaluation, the staff finds that the applicant has adequately addressed the required information relating to COL Items STD COL 17.4-1-A and STD COL 17.4-2-A consistent with the applicable requirements described in Section 17.4.3 of this SER. Therefore, these COL items are closed.

17.4.5 Post Combined License Activities

There are no post COL activities related to this section.

17.4.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information relating to the RAP, and no outstanding information is expected to be addressed in the Fermi 3 COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the RAP that were incorporated by reference are resolved.

In addition, the staff compared the information in the COL application to the relevant NRC regulations, the guidance in Section 17.4 of NUREG–0800, and other NRC RGs. The staff's review finds that the applicant has provided sufficient information to address the COL items and to satisfy the NRC guidance in Section 17.4.3 of this SER.

17.5 Quality Assurance Program Description – Design Certification, Early Site Permits, and New License Applicants

17.5.1 Introduction

This FSAR section discusses the overall QA Program, including the QA Program that is applicable during the design, construction, and operations phases of a nuclear power plant.

17.5.2 Summary of Application

In addition, in FSAR Section 17.5, the applicant provides the following:

COL Items

- EF3 COL 17.2-1-A QA Program for the Construction and Operations Phases
- EF3 COL 17.2-2-A QA Program for Design Activities

The applicant states that the QA applied to activities to adapt the design to specific plant implementation, construction, and operations is addressed in the Detroit Edison Fermi 3 QAPD (FSAR Appendix 17AA). The applicant also states that the QAPD is based on NEI 06-014A, Revision 7, "Quality Assurance Program Description."

- EF3 COL 17.3-1-A Quality Assurance Program Document

The applicant states that the QA applied to DC activities is described in DCD Section 17.1. The applicant also states that the ESP QA is not applicable to Fermi 3.

Supplemental Information

- EF3 SUP 17.5-2

The applicant provides information to resolve ESBWR DCD COL Items 17.2-1-A, 17.2-2-A, and 17.3-1-A by referencing the Fermi 3 QAPD. The QAPD will be applied to QA activities that adapt the design to plant-specific implementation, construction, and operations.

The applicant provides supplemental information EF3 SUP 17.5-2 describing QA Programs that were applied to the COL application development and support activities from January 2007 through December 2009. The applicant describes the QA controls for each of the three phases:

- Development of COL application work products
- Receipt, review, and acceptance of COL application work products
- Application for combined operating license

17.5.3 Regulatory Basis

The relevant requirements of the Commission regulations for the QAPD, and the associated acceptance criteria, are in Section 17.5 of NUREG–0800.

The applicable regulatory requirements for the QAPD are as follows:

- Appendix B to 10 CFR Part 50 requires the applicant to include in the application a description of the QA Program that will be applied to the design, fabrication, construction, and testing of the SSCs of the facility and to establish QA requirements for the design, construction, and operation of those SSCs. The pertinent requirements of Appendix B apply to all activities affecting the safety-related functions of the SSCs, including designing, purchasing, fabricating, handling, shipping, storing, cleaning,

erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying these activities.

- 10 CFR 52.79(a)(17) requires that the application include information with respect to compliance with technically relevant positions of the Three Mile Island requirements of 10 CFR 50.34(f).

- 10 CFR 52.79(a)(25) requires that the description of the QA Program include a discussion of how the applicable requirements of Appendix B have been and will be satisfied and a discussion of how the QA Program will be implemented.

- 10 CFR 52.79(a)(27) requires that the application include information on the managerial and administrative controls to be used for a nuclear power plant and a discussion of how the applicable requirements of Appendix B will be satisfied.

17.5.4 Technical Evaluation

The staff reviewed Section 17.5 of the Fermi 3 COL FSAR and the Fermi 3 QAPD information in FSAR Appendix 17AA. This information is site-specific and is not part of the certified ESBWR DCD. In Supplemental Information EF3 SUP 17.5-2, the applicant discusses the QA Programs that were applied from project inception until 15 months after submitting the license application. The Fermi 3 QAPD addresses the QA Program that will be applied to activities after submitting the license application to adapt the design to plant-specific implementation, construction, and operations.

The staff reviewed and evaluated the Fermi 3 QAPD to determine whether it meets NRC regulations by following the guidance in SRP Section 17.5. SRP Section 17.5 provides an outline of a QA Program acceptable to the staff for the DC, ESP, COL, construction permit, and operating license applicants. The staff developed SRP Section 17.5 using ASME NQA-1–1994 supplemented by additional regulatory and industry guidance for nuclear operating facilities. SRP Section 17.5 also addresses additional QA requirements in 10 CFR Part 50, Appendix A, GDC 1 and 10 CFR 50.34(f)(3)(ii) and (iii). GDC 1 requires that a QA Program be established and implemented. 10 CFR 50.34(f)(3)(ii) and (iii) specify design and construction QA requirements that must be addressed in a QAPD.

The Fermi 3 QAPD is the top-level document that establishes the QA measures to be applied to the activities related to the design, construction, and operation of an ESBWR at the Fermi 3 site. The applicant states that the Fermi 3 QAPD is based on NEI 06–14A, Revision 7. The NRC finds that NEI 06–14A, Revision 7 provides an acceptable format and adequate guidance for establishing a QA Program that meets the requirements of 10 CFR Part 50, Appendix B, as documented in the related SER, “Quality Assurance Program Description,” (ADAMS Accession No. ML101800497). Because the applicant claims to have followed an acceptable QA Program format, the following sections provide (1) additional information related to resolving the RAIs; (2) exceptions to industry standard commitments; and (3) cross-references to related SRP acceptance criteria guidance.

The staff conducted a specific comparison of the Fermi 3 QAPD against NEI 06–14A, Revision 7. The following discussion provides details of the staff’s review and conclusions for each QAPD section.

17.5.4.1 *Organization*

The staff noted that the applicant's QAPD refers to Fermi 3 FSAR Chapter 13 for organizational information guiding the transition from construction to the operating phase. Many sections of the Fermi 3 FSAR, Chapter 13 refer to FSAR Section 17.5 for additional organizational information. The staff's review identified inadequate content, inconsistent organizational titles, and differing regulatory change requirements between FSAR Chapter 13 and Section 17.5. As a result, the staff issued RAIs 17.05-5 and 17.05-6 requesting the applicant to clarify methods for FSAR Chapter 13 content to further define Fermi 3 organizational responsibilities and structure, to provide organizational flowcharts, and to ensure consistent cross-references between FSAR Chapter 13 and Section 17.5. The applicant's response to these RAIs, dated September 30, 2009 (ADAMS Accession No. ML092790561), provides organizational flow charts with additional organizational details and amplifies regulatory change requirements for Fermi 3 FSAR Chapter 13 and QAPD Section 1, "Organization." However, a later staff review identified incomplete organizational information in Chapter 13 and in QAPD Section 1, which required additional clarification. As a result, the staff issued seven supplemental organizational RAI questions that are outlined below and closed RAIs 17.05-5 and 17.05-6.

In RAIs 17.05-10 and 17.05-21, the staff requested the applicant to address the eight notes of NEI 06–14 (previous version of NEI 06-14A), Part II, Section 1, including identifying each project phase and describing the process for an organizational transition between each phase. The applicant's responses to RAI 17.05-10, dated April 16, 2010 (ADAMS Accession No. ML101190369), and to RAI 17.05-21, dated August 13, 2010 (ADAMS Accession No. ML102290043), address the eight notes of NEI 06–14, Part II, Section 1, by outlining the three project phases and describing the transitional process between each phase. The staff reviewed the applicant's proposed changes to Fermi 3 COL FSAR, Chapter 13 and to the QAPD. The staff determined that the changes are consistent with NEI 06–14A, Revision 7, and are therefore acceptable. The staff verified that the applicant's proposed changes are included in Fermi 3 COL FSAR, Revision 3. Therefore, the staff determined that RAIs 17.05-10 and 17.05-21 are closed.

In RAIs 17.05-11, 17.05-13, and 17.05-22, the staff requested the applicant to (1) provide additional primary contractor details; (2) clarify organization sizing responsibility; (3) clarify transition points; and (4) clarify work locations of the described organization. The applicant's responses to these RAIs, dated April 16, 2010, and August 13, 2010 (ADAMS Accession Nos. ML101190369 and ML102290043, respectively), provide additional organizational details and proposed changes to the FSAR and the QAPD. The staff reviewed the applicant's proposed changes to FSAR Chapters 1 and 13 and the QAPD. The staff determined that the changes are consistent with NEI 06–14A, Revision 7 and are therefore acceptable. The staff verified that the applicant's proposed changes are included in the Fermi 3 FSAR, Revision 3. RAIs 17.05-11, 17.05-13, and 17.05-22 are therefore closed.

In RAIs 17.05-14 and 17.05-15, the staff requested the applicant to clarify the sections of the FSAR that describe the design and construction organization and when changes to organizational elements of Fermi 3 FSAR Chapter 13 will be reviewed under 10 CFR 50.54(a). The applicant's response to these RAIs, dated April 16, 2010 (ADAMS Accession No. ML101190369), clarifies the corporate executive, corporate support, and design and construction organizational structure. The applicant also states that the design, construction, technical support, and operating organizational changes will be reviewed under the provisions of 10 CFR 50.54(a). The staff reviewed the applicant's proposed changes to FSAR Chapter 13 and the QAPD. The staff determined that the changes are consistent with NEI 06–14A,

Revision 7 and are therefore acceptable. The staff verified that the applicant's proposed changes are included in the Fermi 3 COL FSAR, Revision 3. RAIs 17.05-5, 17.05-6, 17.05-14, and 17.05-15 are therefore closed.

The staff finds that the applicant's QAPD follows the guidance of Section 17.5, SRP Acceptance Criterion A related to the organization, which is based on the following information. In the QAPD, the applicant assures compliance with the quality standards for QA organizations described by ASME in NQA-1–1994, Basic Requirement 1 and Supplement 1S-1. The QAPD describes and defines the responsibility and authority for planning, establishing, and implementing an effective overall QA Program. The QAPD describes an organization's structure; functional responsibilities; levels of authority; and the interfaces for establishing, executing, and verifying the QAPD implementation. The QAPD establishes independence between the organization responsible for overseeing a function and the organization that performs the function. In addition, the QAPD allows the applicant's management to size the QA organization commensurate with assigned duties and responsibilities.

17.5.4.2 *Quality Assurance Program*

The staff issued RAI 17.05-7 requesting the applicant to describe the qualification requirements for the independent review staff, which should meet or exceed those described in Section 4.7 of American National Standard Institute/American Nuclear Society (ANSI/ANS)-3.1–1993, "American National Standard for Selection, Qualification, and Training of Personnel for Nuclear Power Plants"; and in RG 1.8, Revision 3, "Qualification and Training of Personnel for Nuclear Power Plants." The applicant's response to RAI 17.05-7, dated September 30, 2009 (ADAMS Accession No. ML092790561), revises Section 2.7 of the QAPD to reflect acceptable qualification requirements for the members of the Independent Review Board. The staff reviewed the applicant's response and the proposed changes to Section 2.7 of the QAPD. The staff determined that the changes are consistent with NEI 06-14A, Revision 7 and are therefore acceptable. The staff verified that the applicant's proposed changes are included in the Fermi 3 COL FSAR, Revision 3. Therefore, RAI 17.05-7 is closed. The staff also finds that the QAPD follows the guidance in Section 17.5 of NUREG–0800, SRP Acceptance Criterion W, for independent program reviews because the QAPD provides measures for establishing an independent review program for activities occurring during the operations phase.

Additionally, the staff finds that the QAPD follows the guidance related to training in Section 17.5 of NUREG–0800, SRP Acceptance Criteria S and T, which are based on information that follows. The QAPD describes measures that establish and maintain formal indoctrination and training programs for personnel performing, verifying, or maintaining activities within the scope of the QAPD. The purpose of these measures is to ensure that personnel achieve and maintain suitable levels of proficiency. The plant's technical specifications delineate the minimum qualifications for plant and support staff. Personnel are required to complete the training for positions identified in 10 CFR 50.120, "Training and qualification of nuclear power plant personnel," in accordance with programs accredited by the National Nuclear Accrediting Board of the National Academy for Nuclear Training. The QAPD also establishes minimum training requirements for managers responsible for implementing the QAPD and individuals responsible for planning, implementing, and maintaining the QAPD.

The applicant's QAPD provides assurance of compliance with the quality standards described in NQA-1–1994, Basic Requirement 2 and Supplements 2S-1, 2S-2, 2S-3, and 2S-4 with the following alternatives:

- NQA-1–1994, Supplement 2S-1 includes NQA-1–1994, Appendix 2A-1. The QAPD proposes the following alternatives to the implementation of Supplement 2S-1 and Appendix 2A-1:

  - NQA-1–1994, Supplement 2S-1 states that the organization designates those activities that require qualified inspectors and test personnel and establishes written procedures for the qualification of these personnel. As an alternative to this requirement, the QAPD proposes that a qualified engineer may plan inspections, evaluate the capabilities of an inspector, or evaluate the training program for inspectors. For the purposes of these functions, a qualified engineer is one who has a baccalaureate degree in engineering in a discipline related to the inspection or test activity (i.e., electrical, mechanical, or civil engineering) and has at least five years of engineering work experience, with at least two years of this experience related to nuclear facilities. The staff evaluated this proposed alternative and determined that the designation of a qualified engineer to plan inspections, evaluate inspectors, or evaluate the inspector qualification programs is consistent with the training and qualification criteria of 10 CFR Part 50, Appendix B, Criterion II, "Quality Assurance Program," and NQA-1–1994, Supplement 2S-1. Therefore, the staff finds this alternative acceptable.

  - NQA-1–1994, Appendix 2A-1 provides guidance for qualifying inspection and test personnel as Level I, II, or III. As an alternative to this guidance, the QAPD proposes that personnel performing independent quality verification inspections, examinations, measurements, or tests will be required to possess qualifications equal to or better than those required for performing the task being verified. In addition, the verification performed must be within the skills of these personnel and addressed by procedures. These personnel will not be responsible for planning quality verification inspections or tests (i.e., establishing hold points and acceptance criteria in procedures and determining responsibility for performing the inspection), evaluating inspection training programs, or certifying inspection personnel. The staff evaluated this proposed alternative and determined that it is consistent with inspection and test personnel initial qualification requirements specified in Section 17.5 of NUREG–0800, SRP Acceptance Criterion T.5. Therefore, the staff finds this alternative acceptable.

  - NQA-1–1994, Supplement 2S-2 states that nondestructive examination personnel must be qualified. As an alternative to this requirement, the QAPD proposes to follow the applicable standard cited in Sections III and XI of the ASME Boiler and Pressure Vessel Code (ASME Code). 10 CFR 50.55a, "Codes and standards," also requires the use of the latest edition and addenda in Sections III and XI of the ASME Code. The staff evaluated this proposed alternative and determined that it is consistent with the regulation in 10 CFR Part 50, Appendix B, Criterion II. Therefore, the staff finds this alternative acceptable.

  - NQA-1–1994, Supplement 2S-3 states that the prospective lead auditors must have participated in a minimum of five audits in the previous three years. As an alternative to this requirement, the QAPD proposes to follow the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion S.4.c, which states that prospective lead auditors shall demonstrate their ability (1) to properly conduct the audit process as implemented by the company; (2) to effectively lead

an audit team; and (3) to effectively organize and report results, including participation in at least one nuclear audit within the year preceding the date of qualification. The staff evaluated this proposed alternative and determined that it is consistent with the regulation in 10 CFR Part 50, Appendix B, Criterion II. Therefore, the staff finds this alternative acceptable.

The staff finds that the applicant's QAPD follows the guidance in Section 17.5 of NUREG-0800, SRP Acceptance Criterion B for the QA Program based on information that follows. The QAPD establishes measures to implement a QA Program to ensure that the design, construction, and operation of a nuclear power plant are in accordance with governing regulations and license requirements. The QA Program comprises those planned and systematic actions that are necessary to provide confidence that SSCs will perform their intended safety functions, including certain nonsafety-related SSCs and activities that are significant contributors to plant safety, as described in the Fermi 3 COL FSAR. The QA Program requires the maintenance of a list or system identifying SSCs and activities applicable to the QAPD.

Furthermore, the staff finds that the applicant's QAPD provides measures to assess the adequacy of the QAPD at least once each year or at least once during the existence of the activity, whichever is shorter. The program allows the period of time for assessing the QAPD during the operations phase to be extended to once every two years. In addition, the staff finds that the applicant's QAPD is consistent with Section 17.5 of NUREG–0800, SRP Acceptance Criterion B.8 because the QAPD applies a grace period of 90 days for activities that must be performed on a periodic basis. The next due date for the performance of an activity that invokes the 90-day grace period remains unchanged (i.e., the next due date is not advanced forward in time). The next due date for an activity performed before the scheduled due date is moved earlier (i.e., the next due date is advanced backward in time), so as not to exceed the interval prescribed for the performance of the activity.

17.5.4.3 *Design Control*

The staff finds that the applicant's QAPD follows the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criterion C for design control based on information that follows. The QAPD establishes the necessary measures to control the design, design changes, and temporary modifications (e.g., temporary bypass lines, electrical jumpers and lifted wires, and temporary setpoints) of items that are subject to the provisions of the QAPD. The QAPD design process includes provisions to control design inputs, outputs, changes, interfaces, records, and organizational interfaces with the applicant and the plant's suppliers. These provisions ensure that the design inputs (i.e., design bases and the performance, regulatory, quality, and quality verification requirements) are correctly translated into design outputs (i.e., analyses, specifications, drawings, procedures, and instructions). The QAPD provides for individuals knowledgeable about QA principles to review design documents and ensure that they contain the necessary QA requirements. The applicant's QAPD also provides assurance of compliance with the quality standards described in NQA-1–1994, Basic Requirement 3 and Supplement 3S-1, Subpart 2.20 for the subsurface investigation requirements and Subpart 2.7 for the standards for computer software QA controls, to establish the program for design control and verification.

17.5.4.4 *Procurement Document Control*

The staff determined that the applicant's QAPD provides assurance of compliance with the quality standards described in NQA-1–1994, Basic Requirement 4 and Supplement 4S-1, with the following alternatives:

- In NQA-1–1994, Supplement 4S-1, Section 2.3 states that procurement documents must require suppliers to have a documented QA Program that implements NQA-1–1994, Part I.

    - As an alternative to this requirement, the QAPD proposes that suppliers have a documented QA Program that meets the requirements of Appendix B to 10 CFR Part 50, as applicable to the circumstances of the procurement. The staff evaluated this proposed alternative and determined that it is consistent with Appendix B, Criterion IV, "Procurement Document Control." Therefore, the staff finds this alternative acceptable.

    - As an alternative to this requirement, the QAPD proposes that procurement documents could allow suppliers to work under the applicant's QAPD, including its implementation procedures, if suppliers do not have their own QA program. The staff evaluated this proposed alternative and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion G, "Control of Purchased Material, Equipment, and Services." Specifically, the QAPD provides measures to evaluate prospective suppliers so that only qualified suppliers are selected, acceptance actions are performed for procuring products and services, and suppliers are periodically audited and evaluated to ensure that qualified suppliers continue to provide acceptable products and services. Therefore, the staff finds this alternative acceptable.

- In NQA-1–1994, Supplement 4S-1, Section 3 states that procurement documents are to be reviewed before awarding a contract. As an alternative to this requirement, the QAPD proposes to conduct the QA review of procurement documents through a review of the applicable procurement specifications, including the technical and quality procurement requirements, before awarding a contract. In addition, procurement document changes (e.g., scope, technical, or quality requirements) will also receive a QA review. The staff evaluated this proposed alternative and determined that it provides an adequate QA review of procurement documents before awarding a contract and after any changes. Therefore, the staff finds this alternative acceptable.

- In the QAPD, the applicant provides assurance that procurement documents prepared for commercial-grade items and procured as safety-related items shall contain technical and QA requirements to which the procured item can be appropriately dedicated. The staff evaluated and determined that it is consistent with staff guidance in Generic Letter (GL) 89–02, "Actions to Improve the Detection of Counterfeit and Fraudulently Marked Products," dated March 21, 1989, and GL 91–05, "Licensee Commercial-Grade Procurement and Dedication Programs," dated April 9, 1991, as delineated in Section 17.5 of NUREG–0800, SRP Acceptance Criteria U.1.d and U.1.e. Therefore, the staff finds this alternative acceptable.

The staff finds that the applicant's QAPD follows the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criterion D for procurement document control based on information that

follows. The QAPD establishes the necessary administrative controls and processes to ensure that procurement documents include or reference applicable regulatory, technical, and QA Program requirements. As noted in Section 17.5 of NUREG–0800, SRP Acceptance Criterion D.1, the applicable technical, regulatory, administrative, quality, and reporting requirements are invoked for the procurement of items and services. These requirements include specifications, codes, standards, tests, inspections, special processes, and the regulations in 10 CFR Part 21, "Reporting of Defects and Noncompliance."

17.5.4.5 *Instructions, Procedures, and Drawings*

The staff finds that the applicant's QAPD follows the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criterion E for instructions, procedures, and drawings based on information that follows. The QAPD establishes the necessary measures and governing procedures to ensure that activities affecting quality are prescribed by and performed in accordance with documented instructions, procedures, and drawings. The applicant's QAPD also provides assurance of compliance with the quality standards for instructions, procedures, and drawings described in NQA-1–1994, Basic Requirement 5 for establishing procedural controls.

17.5.4.6 *Document Control*

The staff finds that the applicant's QAPD follows the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criterion F for document controls based on information that follows. The QAPD establishes the necessary measures and governing procedures to control the preparation, review, approval, and issuance of and changes to documents that specify QA requirements or prescribe measures for controlling activities affecting quality, including organizational interfaces. The QAPD provides measures to ensure that the same organization that performed the original review and approval also reviews and approves revisions or changes to documents, unless other organizations are specifically designated.

Furthermore, a list of all controlled documents that identify the current approved revision or date is maintained so personnel can readily determine the appropriate document to use. To ensure effective and accurate procedures during the operational phase, applicable procedures are reviewed and updated as necessary, which is consistent with the staff guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion F.8. The applicant's QAPD also provides assurance of compliance with the quality standards described in NQA-1–1994, Basic Requirement 6 and Supplement 6S-1, which establish document control provisions.

17.5.4.7 *Control of Purchased Material, Equipment, and Services*

The staff evaluated the QAPD and determined that the applicant provides assurance of compliance with the quality standards for the control of purchased materials, equipment, and services described in NQA-1–1994, Basic Requirement 7 and Supplement 7S-1, which establish procurement verification controls with the following exceptions and alternatives:

- NQA-1–1994, Basic Requirement 7 and Supplement 7S-1 state that procurement sources and suppliers' performance are to be evaluated. As an exception to these requirements, the QAPD proposes that other 10 CFR Part 50 licensees, authorized nuclear inspection agencies, the National Institute of Standards and Technology (NIST), and other State and Federal agencies that may provide items or services to the applicant are not required to be evaluated or audited.

The staff acknowledged that 10 CFR Part 50 licensees, authorized nuclear inspection agencies, the National Voluntary Laboratory Accreditation Program (NVLAP) administered by NIST, and other State and Federal agencies perform work under QA Programs that are acceptable to the NRC, and no additional audits or evaluations are required. However, the applicant remains responsible for ensuring that procured items or services conform to Appendix B to 10 CFR Part 50; to applicable ASME Code requirements; and to other regulatory requirements and commitments. The applicant also remains responsible for ensuring that the items or services are suitable for the intended application and for documenting the evaluations that support this conclusion. The staff finds this exception consistent with NEI 06–14A, Revision 7 and therefore acceptable.

- In Section 17.5 of NUREG–0800, SRP Acceptance Criterion L.8 establishes provisions for the procurement of commercial-grade calibration services for safety-related applications. As an exception to these provisions, the QAPD proposes that procurement source evaluations and selection measures not be required provided that all of the following conditions are met:

  - Purchase documents will impose additional technical and administrative requirements to satisfy any licensee-specific QAPD and technical requirements.

  - Purchase documents will require reporting of as-found calibration data when calibrated items are found to be out of tolerance.

  - The supplier's accreditation will require a documented review that verifies the following:

    1) The calibration laboratory holds a domestic accreditation from any one of the following accrediting bodies, which are recognized by the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement:

       a. NVLAP, administered by NIST

       b. American Association for Laboratory Accreditation (A2LA), as recognized by the NVLAP

       c. ACLASS Accreditation Services (ACLASS)

       d. International Accreditation Service (IAS)

       e. Laboratory Accreditation Bureau (L-A-B)

       f. Other NRC-approved laboratory accrediting bodies

    2) The accreditation encompasses the ANS/International Organization for Standardization International Electrotechnical Commission 17025, "General Requirements for the Competence of Testing and Calibration Laboratories."

    3) The published scope of accreditation for the calibration laboratory covers the necessary measurement parameters, ranges, and uncertainties.

The staff evaluated and found the ACLASS, IAS, L-A-B, NVLAB, and A2LA accreditation programs consistent with NEI 06-14A, Revision 7 and thus acceptable.

- In NQA-1–1994, Supplement 7S-1, Section 8.1 states that documented evidence must conform to procurement documents and be available at the nuclear facility site before installation or use. As an alternative to the requirement that documented procurement evidence be available at the nuclear facility site during construction, the QAPD proposes that documented evidence may be stored in physical or in electronic form under the control of the applicant or its supplier(s) and at a location(s) other than the nuclear facility site as long as the documents can be accessed at the nuclear facility site during construction. The applicant states that after the completion of construction, sufficient as-built documentation will be available to the licensee to support operations.

  The staff determined that implementation of this alternative would allow access to and review of the necessary procurement documented evidence at the nuclear facility site, both before installation and before use. Therefore, the staff finds that this alternative is acceptable.

- As an alternative to the requirements that control commercial-grade items and services in NQA-1–1994, Supplement 7S-1, Section 10, the applicant provides assurance in the QAPD to follow the NRC guidance discussed in GLs 89–02 and 91–05. In addition, the applicant established and described special quality verification requirements in applicable documents to assure that the commercially procured items will perform satisfactorily and the documents will determine critical characteristics, technical evaluations, receipt requirements, and quality evaluations of the items to ensure that they are suitable for their intended use. In addition, the applicant provides assurance in the QAPD to use other appropriate and approved regulatory means and controls to support the applicant's commercial-grade dedication activities. The applicant will also assume 10 CFR Part 21 reporting responsibility for all items that are dedicated as safety related.

The staff determined that this alternative improves the likelihood of detecting counterfeit and fraudulently marked products and improves the commercial-grade dedication programs. This alternative is consistent with the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criteria U.1.d and U.1.e. Therefore, the staff finds this alternative acceptable.

The staff finds that the applicant's QAPD follows the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criterion G for the control of purchased materials, equipment, and services based on information that follows. The QAPD establishes the necessary measures and governing procedures to control the procurement of items and services and to ensure conformance with specified requirements. The program provides measures for evaluating prospective suppliers so that only qualified suppliers are selected. In addition, the program requires that suppliers be periodically audited and evaluated to ensure that qualified suppliers continue to provide acceptable products and services.

Furthermore, the program provides for acceptance actions that include source verification, receipt inspection, pre- and post-installation tests, and the review of documentation, such as certificates of conformance, to ensure that procurement, inspections, and test requirements have been satisfied before relying on the item to perform its intended safety function. Purchased items (such as components, spares, and replacement parts necessary for plant operation, refueling, maintenance, and modifications) and services are subject to quality and

technical requirements at least equivalent to those specified for original equipment, or properly reviewed and approved revisions, to ensure that the items are suitable for the intended service and are of an acceptable quality that is consistent with their effect on safety.

17.5.4.8 *Identification and Control of Materials, Parts, and Components*

The staff finds that the applicant's QAPD follows the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criterion H for the identification and control of materials, parts, and components (material traceability) based on information that follows. The QAPD establishes the necessary measures for the identification and control of items such as materials—including consumables and items with limited shelf life, parts, components, and partially fabricated subassemblies. The identification of items is maintained throughout fabrication, erection, installation, and use, so that the item can be traced to its documentation consistent with the item's effect on safety. The applicant's QAPD also provides assurance to comply with the quality standards for material traceability described in NQA-1–1994, Basic Requirement 8 and Supplement 8S-1, which establish provisions for the identification and control of items.

17.5.4.9 *Control of Special Processes*

The staff finds that the applicant's QAPD follows the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criterion I, for the control of special processes based on information that follows. The QAPD establishes programs, procedures, and processes to ensure that special processes requiring interim controls to maintain quality such as welding, heat treating, chemical cleaning, and nondestructive examinations are implemented and controlled in accordance with applicable codes, specifications, and standards. The applicant's QAPD also provides assurance to comply with the quality standards for the control of special processes described in NQA-1–1994, Basic Requirement 9 and Supplement 9S-1, which establish measures for the control of special processes.

17.5.4.10 *Inspection*

The Fermi 3 QAPD provides assurances of compliance with QA standards for inspections described in NQA-1–1994, Basic Requirement 10, Supplement 10S-1 and Subparts 2.4, 2.5, and 2.8 establishing inspection requirements with the following provisions:

- NQA-1–1994, Subpart 2.4 requires the use of the Institute of Electrical and Electronics Engineers (IEEE) Standard (Std) 336–1985, "IEEE Standard Installation, Inspection, and Testing Requirements for Power, Instrumentation, and Control Equipment at Nuclear Facilities." IEEE Std 336–1985 refers to IEEE 498–1985, "IEEE Standard Requirements for the Calibration and Control of Measuring and Test Equipment Used in Nuclear Facilities." Each of these standards uses the definition of safety systems equipment from IEEE Std 603–1980, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations." IEEE Std 603–1980 defines "safety system" as:

  > Those systems (the reactor trip system, an engineered safety feature, or both, including all their auxiliary supporting features and other auxiliary feature) which provide a safety function. A safety system is comprised of more than one safety group of which any one safety group can provide the safety function.

In the QAPD, the applicant provides information to satisfy the IEEE Std 603–1980 definition of safety systems equipment to appropriately implement NQA-1–1994, Subpart 2.4. This definition applies only to equipment in the context of NQA-1–1994, Subpart 2.4. The staff evaluated the QAPD and determined that the use of the definition of safety systems equipment is acceptable and is consistent with the requirements in NQA-1–1994, Subpart 2.4.

- In NQA-1–1994, Supplement 10S-1, Section 3.1 states that inspection personnel will not report to the immediate supervisor responsible for performing the work being inspected. As an alternative to this requirement, the QAPD proposes that QA inspectors will report to quality control management while performing these inspections. The staff determined that this alternative is consistent with Section 17.5 of NUREG–0800, SRP Acceptance Criterion J.1. Therefore, the staff finds that this alternative is acceptable.

The staff finds that the applicant's QAPD follows the guidance of Section 17.5 of NUREG-0800, SRP Acceptance Criterion J, for inspections based on information that follows. The QAPD establishes the necessary measures for implementing inspections to ensure that items, services, and activities affecting safety meet established requirements and conform to applicable documented specifications, instructions, procedures, and design documents. The inspection program establishes requirements for planning inspections, determining applicable acceptance criteria, setting the frequency of inspections, and identifying special tools needed to perform the inspection. Properly qualified personnel independent of those who performed or directly supervised the work are required to perform the inspections.

17.5.4.11 *Test Control*

The staff determined that the Fermi 3 QAPD implements the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion K, for test control based on information that follows. The QAPD establishes the necessary measures and governing provisions to demonstrate that items subject to the provisions of the QAPD will perform satisfactorily in service, that the plant can be operated safely as designed, and that the operation of the plant as a whole is satisfactory. The applicant's QAPD also provides assurance to comply with the quality standards for test control described in NQA-1–1994, Basic Requirement 11 and Supplement-11S-1, to establish provisions for testing. Furthermore, the applicant also provides assurance in the QAPD to comply with the quality standards for software test control described in NQA-1–1994, Supplements 11S-2 and Subpart 2.7, to establish provisions to ensure that computer software used in applications affecting safety be prepared, documented, verified, tested, and used in a manner that obtains the expected outputs and maintains configuration control.

17.5.4.12 *Control of Measuring and Test Equipment*

The Fermi 3 QAPD provides assurances of compliance with QA standards for measuring and test equipment (M&TE) described in NQA-1–1994, Basic Requirement 12 and Supplement 12S–1 and establishes provisions that control the M&TE with the following clarification and exception:

- The QAPD clarifies that the out-of-calibration conditions described in paragraph 3.2 of Supplement 12S-1 of NQA-1–1994 refer to cases where the M&TE is found to be out of the required accuracy limits (i.e., out of tolerance) during calibration. The staff

determined that this clarification for the out-of-calibration conditions is consistent with Supplement 12S-1. Therefore, the staff finds that this clarification is acceptable.

- As an alternative to NQA-1–1994, Subpart 2.4, Section 7.2.1, "Calibration Labeling Requirements," the QAPD proposes that when it is impossible or impractical to mark equipment with required calibration information because of equipment size or configuration, the required calibration information will be documented and traceable to the equipment. The staff determined that this alternative is consistent with NRC staff guidance provided in Section 17.5 of NUREG–0800, SRP Acceptance Criterion L.3. Therefore, the staff finds that this alternative is acceptable.

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion L, for the control of M&TE based on information that follows. The QAPD establishes the necessary measures to control the calibration, maintenance, and use of the M&TE that provide information important to safe plant operations.

17.5.4.13 *Handling, Storage, and Shipping*

The staff determined that the Fermi 3 QAPD provides assurances of compliance with QA standards for handling, storage, and shipping described in NQA-1–1994, Basic Requirement 13 and Supplement 13S-1, which establish provisions for handling, storage, and shipping. In the QAPD, the applicant also provides assurance to comply with the quality standards described in NQA-1–1994, Subpart 2.1, Subpart 2.2, Subpart 2.3, and Subpart 3.2, Appendix 2.1 during the construction and operational phases of the plant, as applicable, with the following clarifications and alternatives:

- In NQA-1–1994, Subpart 2.1, Section 3.1 and 3.2 establish criteria for classifying items into cleanness classes and requirements for each class. The QAPD proposes establishing cleanness requirements on a case-by-case basis consistent with the other provisions of Subpart 2.1. The QAPD clarifies that appropriate cleanliness controls for work on safety-related equipment will minimize introduction of foreign materials and will maintain system/component cleanliness throughout maintenance or modification activities, including documented verification of the absence of foreign materials before system closure. The staff finds that this alternative and clarification are consistent with NEI 06–14A, Revision 7, and therefore acceptable.

- In NQA-1–1994, Subpart 2.2, Section 2.2 establishes criteria for classifying items into protection levels. Instead of classifying items into protection levels during the operational phase, the QAPD proposes to establish controls for the packaging, shipping, handling, and storage of such items on a case-by-case basis with due regard for the item's complexity, use, and sensitivity to damage. The QAPD clarifies that before installation or use, the items will be inspected and serviced as necessary to assure that no damage or deterioration exists that could affect their functions. The staff finds that this alternative and clarification are consistent with NEI 06–14A, Revision 7, and therefore acceptable.

- In NQA-1–1994, Subpart 2.2, Section 6.6 states that the preparation of records must include information on personnel access to QA records. The QAPD establishes the necessary measures for documenting personnel authorized to access storage areas and record personnel access. However, the QAPD proposes not to consider these

documents as QA records. As an alternative, the applicant will retain these documents in accordance with plant administrative controls. The staff determined that these records did not meet the classification of a QA record as defined in NQA-1–1994, Supplement 17S-1, Section 2.7. Therefore, the staff finds that this alternative is acceptable.

- In NQA-1–1994, Subpart 2.2, Section 7.1 refers to Subpart 2.15 for requirements related to handling items. The QAPD clarifies that the scope of Subpart 2.15 includes hoisting, rigging, and transporting items for nuclear power plants during construction. The staff determined that this clarification is acceptable because it distinguishes between the requirements for construction and operations.

- In NQA-1–1994, Subpart 2.3, Section 2.3 requires the establishment of five zone designations for housekeeping cleanliness controls. Instead of the five-level zone designations, the QAPD proposes to control housekeeping activities based on considerations of what is necessary and appropriate for the activity involved. The QAPD clarifies that the controls are implemented through procedures or instructions. The QAPD states that the factors considered in developing the procedures and instructions include cleanliness control, personnel safety, fire prevention and protection, radiation control, and security. The staff finds that this alternative and clarification are consistent with NEI 06–14A, Revision 7, and therefore acceptable.

- In NQA-1–1994, Subpart 3.2, Appendix 2.1 establishes cleaning and cleanness controls for fluid systems and associated components. The QAPD clarifies Section 3 precautions in accordance with RG 1.37, Revision 1, "Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants." The QAPD states that a suitable chloride stress-cracking inhibitor should be added to the fresh water used to flush systems containing austenitic stainless steels. The staff finds that this clarification is consistent with NEI 06–14A, Revision 7, and is therefore acceptable.

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion M for handling, storage, and shipping based on information that follows. The QAPD establishes the necessary measures to control the handling, storage, packaging, shipping, cleaning, and preservation of items to prevent inadvertent damage or loss and to minimize deterioration.

17.5.4.14 *Inspection, Test, and Operating Status*

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion N on the inspection, testing, and operating status of items subject to QA oversight based on information that follows. The QAPD establishes the necessary measures to identify the inspection, testing, and operating status of items and components subject to the provisions of the QAPD to maintain personnel and reactor safety and to avoid the inadvertent operation of equipment. The applicant's QAPD provides assurances to comply with the quality standards in this area described in NQA-1–1994, Basic Requirement 14, to establish control over activities related to their inspection, testing, and operating status.

17.5.4.15 *Nonconforming Materials, Parts, or Components*

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion O for nonconforming materials, parts, or components based on information that follows. The QAPD establishes the necessary measures to control items, including services that do not conform to specified requirements, to prevent inadvertent installation or use. Instances of nonconformance are evaluated for their impact on the operability of quality SSCs to ensure that the final condition does not adversely affect the safety, operation, or maintenance of the item or service. The results from evaluations of conditions adverse to quality are analyzed to identify quality trends that are documented and reported to upper management, in accordance with the applicable procedures. In addition, the QAPD provides for the necessary measures to implement the requirements of 10 CFR Part 52, 10 CFR 50.55(e), and/or 10 CFR Part 21 during COL design and construction; and 10 CFR Part 21 during operations. The applicant's QAPD also provides assurances to comply with the quality standards for nonconforming materials, parts, or components described in NQA-1–1994, Basic Requirement 15 and Supplement 15S-1, to establish measures for nonconforming materials.

17.5.4.16 *Corrective Action*

The staff issued RAI 17-05.2 requesting the applicant to clarify how the effectiveness of specific reporting programs referenced in the QAPD will be monitored. The applicant's response to RAI 17.05-2 dated September 30, 2009 (ADAMS Accession No. ML092790561), clarifies how the applicant will implement and monitor reporting programs that are applicable to safety-related activities and services. The staff reviewed the applicant's response and proposed changes to Section 16.1 of the QAPD. The staff determined that the changes are consistent with NEI 06-14A, Revision 7, and are therefore acceptable. The staff verified that the applicant has incorporated the proposed changes in the Fermi 3 COL FSAR, Revision 3. Therefore, RAI 17.05-2 is closed.

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion P, for corrective action programs based on information that follows. The QAPD establishes the necessary measures to promptly identify, control, document, classify, and correct conditions that are adverse to quality. The QAPD requires personnel to identify these known adverse conditions in reports that are analyzed to identify trends. Significant conditions adverse to quality are documented and reported to the responsible management. In the case of suppliers working on safety-related activities or in similar situations, the applicant may delegate specific responsibility for the Corrective Action Program. However, the applicant maintains responsibility for the program's effectiveness. In addition, the QAPD establishes the measures necessary for implementing a reporting program in accordance with the requirements of 10 CFR Part 52, 10 CFR 50.55(e), and/or 10 CFR Part 21 during COL design and construction; and 10 CFR Part 21 during operations. The applicant's QAPD also provides assurance to comply with the quality standards described in NQA-1–1994, Basic Requirement 16, to establish a Corrective Action Program.

17.5.4.17 *Quality Assurance Records*

The staff evaluated and determined that in the Fermi 3 QAPD, the applicant provides assurance to comply with the quality standards for QA records described in NQA-1–1994, Basic Requirement 17 and Supplement 17S-1, for establishing provisions for records with the following alternative:

- In NQA-1–1994, Supplement 17S-1, Section 4.2(b) states that records must be firmly attached in binders or placed in folders or envelopes for storage in steel file cabinets or on shelving in containers. As an alternative to this requirement, the QAPD proposes that hard-copy records be stored in steel cabinets or on shelving in containers, except that methods other than binders, folders, or envelopes may be used to organize records for storage.

  The staff finds that this alternative is consistent with NEI 06–14A, Revision 7, and is therefore acceptable.

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion Q, for QA records based on information that follows. The QAPD establishes the necessary measures to ensure that sufficient records of items and activities affecting quality are generated, identified, retained, maintained, and able to be retrieved. Concerning the use of storage and retrieval systems for electronic records, the applicant complies with the NRC guidance in GL 88–18, "Plant Record Storage on Optical Disks," dated October 20, 1988; and the applicant will manage the storage of QA records consistent with Regulatory Issue Summary 2000-18, "Guidance on Managing Quality Assurance Records in Electronic Media," dated October 23, 2000; and associated Nuclear Information and Records Management Association (NIRMA) Technical Guide (TG) 11-1998, "Authentication of Records and Media"; TG 15-1998, "Management of Electronic Records"; TG 16-1998, "Software Configuration Management and Quality Assurance"; and TG 21-1998, "Electronic Records Protection and Restoration".

17.5.4.18 *Quality Assurance Audits*

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion R, for QA audits based on information that follows. The QAPD establishes the necessary measures to implement audits verifying that activities covered by the QAPD are performed in conformance with the documented requirements. The audits will be reviewed for effectiveness as part of the overall audit process. Additionally, the QAPD provides for the applicant to conduct periodic internal and external audits. Internal audits are conducted to determine the adequacy of programs and procedures being audited (by representative sampling) and whether they are meaningful and comply with the overall QAPD. External audits determine the adequacy of supplier and contractor QA Programs.

Furthermore, internal audits of organization and facility activities conducted before placing the facility in operation should be performed in such a manner, so as to ensure that an audit of all applicable QA Program elements is completed for each functional area at least once each year or at least once during the life of the activity—whichever is shorter. Internal audits conducted after placing the facility in operation are performed with a frequency commensurate with the safety significance of the program or activity, and in such a manner as to ensure that an audit of all applicable QA program elements is completed for each functional area within a period of 2 years. Internal audit frequencies of well-established activities conducted after placing the facility in operation may be extended one year at a time beyond the above two-year interval based on the results of an annual evaluation of the applicable functional area and on objective evidence that the functional area activities are being satisfactorily accomplished. However, the internal audit frequency interval should not exceed a maximum of 4 years.

The applicant also ensures that audits are documented and audit results are reviewed. In accordance with the QAPD, the applicant will respond to all audit findings and initiate appropriate corrective actions. Where corrective actions are indicated, the applicant will document the follow-up of applicable areas through inspections, reviews, repeat audits, or other appropriate means to verify the implementation of assigned corrective actions.

The applicant's QAPD also provides assurance to comply with the standards for QA audits described in NQA-1–1994, Basic Requirement 18 and Supplement 18S-1, to establish an independent audit program.

17.5.4.19 *Nonsafety-Related SSC Quality Assurance Control*

17.5.4.19.1 Nonsafety-Related SSCs – Significant Contributors to Plant Safety

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion V.1, on controls related to nonsafety-related SSCs based on information that follows. The QAPD establishes program controls and applies them to nonsafety-related SSCs that are significant contributors to plant safety and to which Appendix B to 10 CFR Part 50 does not apply. The QAPD applies specific controls to these items in a selected manner to target the characteristics or critical attributes that render the SSCs significant contributors to plant safety consistent with applicable sections in the QAPD.

17.5.4.19.2 Nonsafety-Related SSCs Credited for Regulatory Events

The staff evaluated and determined that the applicant's QAPD follows the guidance of Section 17.5 of NUREG–0800, SRP Acceptance Criterion V.2, which establishes the quality requirements for nonsafety-related SSCs credited for regulatory events based on information that follows. In the Fermi 3 QAPD, the applicant provides assurance to comply with the following regulatory guidance:

- The applicant shall implement QA provisions for the fire protection system in accordance with Regulatory Position 1.7, "Quality Assurance," in RG 1.189, Revision 2, "Fire Protection for Operating Nuclear Power Plants," as identified in FSAR Chapter 1.

- The applicant shall implement QA provisions for anticipated transient without scram equipment in accordance with Part III, Section 1 of the QAPD.

- The applicant shall implement QA provisions for station blackout equipment in accordance with Part III, Section 1 of the QAPD.

17.5.4.20 *Regulatory Commitments*

To determine how the applicant meets all of the regulatory requirements, the staff identified regulatory commitment information requiring further clarification. The staff issued RAI 17.05-23 requesting the applicant to clarify (1) the RG commitments in QAPD Part IV, "Regulatory Commitments"; (2) the evaluation of RG conformance in FSAR Table 1.9-202; and (3) the regulatory commitment change process. The staff also requested additional details on the applicant's regulatory commitments in RAIs 17.05-24, 17.05-25, and 17.05-26.

The applicant's response to RAI 17.05-23, dated September 2, 2010 (ADAMS Accession No. ML102570700), and the applicant's responses to RAIs 17.05-24 through 17.05-26, dated

November 19, 2010 (ADAMS Accession No. ML103260455), clarify the RG commitments; the evaluation of RG conformance; and the regulatory commitment change process. The applicant states that QAPD Part IV, "Regulatory Commitments," and Part V, "Additional Quality Assurance and Administrative Controls for the Plant Operational Phase," are updated and incorporate NEI 06-14, Revision 9 (issued as NEI 06–14A, Revision 7). The updated Part IV of the QAPD includes commitments to RG 1.8, Revision 3 and RG 1.28, Revision 3, "Quality Assurance Program Requirements (Design and Construction)." The applicant also adds verification that the QAPD incorporates the administrative controls in ANSI N18.7–1976/ANS-3.2, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," and RG 1.33, Revision 2, "Quality Assurance Program Requirements (Operations)," which are not included in NQA-1-1994 as an alternative to RG 1.33.

The staff reviewed the applicant's proposed changes to Fermi 3 COL FSAR, Table 1.9-202 and to the QAPD. The staff determined that the changes are consistent with NEI 06–14A, Revision 7, and are therefore acceptable. The staff verified that the applicant's proposed changes are included in the Fermi 3 COL FSAR, Revision 3. Therefore, RAIs 17.05-23 through 26 are closed.

The staff evaluated and determined that the applicant's QAPD follows the guidance of SRP Section 17.5 of NUREG–0800, SRP Acceptance Criterion U, for describing regulatory commitments based on information that follows. The QAPD establishes QA Program commitments. The applicant's QAPD provides assurance of compliance with the following RGs and other QA standards that are consistent with NEI 06–14A, Revision 7, to supplement and support the QAPD:

- RG 1.8, Revision 3.
- RG 1.26, Revision 4, "Quality Group Classification and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants." In the QAPD, the applicant provides assurance of compliance with the regulatory positions of this guidance for site-specific SSCs not classified by the ESBWR.
- RG 1.28, Revision 3.
- RG 1.29, Revision 4, "Seismic Design Classification." In the QAPD, the applicant provides assurance of compliance with the regulatory positions of this guidance for site-specific SSCs not classified by the ESBWR.
- RG 1.37, Revision 1.
- RG 1.54, Revision 2, "Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants."
- ASME NQA-1–1994 (Parts I, II, and III).
- NIRMA TGs, as described in Section 17 of the QAPD.

17.5.4.21 *Additional Quality Assurance and Administrative Controls for the Plant Operational Phase*

The staff evaluated and determined that Part V, "Additional Quality Assurance and Administrative Controls for the Plant Operational Phase," of the QAPD provides requirements for meeting the regulatory positions of RG 1.33 Revision 2, as an alternative to RG 1.33. In a letter dated November 19, 2010 (ADAMS Accession No. ML103260455), the applicant verifies that the Fermi 3 QAPD has incorporated the administrative controls in ANSI N18.7–1976/ANS-3.2 and RG 1.33 Revision 2, which are not included in NQA-1–1994. The applicant also provides an annotated version of NEI 06–14A, Revision 7, Appendix 1, "Table of Where Regulatory Guide 1.33, Revision 2, and ANSI N18.7-1976 Requirements are Addressed by NQA-1–1994 Standards and/or the NEI 06–14 QAPD," which documents this verification. The staff reviewed Part V of the QAPD and the annotated version of NEI 06–14A, Revision 7, Appendix 1. The staff evaluated and determined that the alternative is consistent with the guidance in NEI 06–14, Subsection 3.2.3.1, "Alternative for Commitment to RG 1.33," (ADAMS Accession No. ML101800497) and is therefore acceptable.

Additionally, the staff verified that a sample of the administrative controls included in NEI 06-14A, Revision 7, Appendix 1, was incorporated in the Fermi 3 COL FSAR. The staff finds the sample to be appropriately incorporated. The staff therefore accepted the applicant's verification that all of the required administrative controls have been incorporated in the Fermi 3 QAPD.

Based on the preceding information, the staff finds that the applicant's QAPD follows the guidance in NEI 06–14A, Revision 7, for describing additional QA and administrative controls during the operational phase and is therefore acceptable.

17.5.4.22 *Staff Review of Quality Assurance Program*

The staff reviewed and evaluated the applicant's QA Program for attributes outside of the Fermi 3 QAPD, as discussed above. This section provides the details of the staff's review and includes:

- Resolution of COL Items
- Evaluation of Supplemental Information EF3 SUP 17.5-2
- Resolution of Fermi 3 QA implementation inspection violations
- Resolution of remaining staff's QA RAIs

COL Items

- EF3 COL 17.2-1-A — QA Program for the Construction and Operations Phases
- EF3 COL 17.2-2-A — QA Program for Design Activities
- EF3 COL 17.3-1-A — Quality Assurance Program Document

The applicant provides the Fermi 3 QAPD to address and resolve ESBWR DCD COL Items 17.2-1-A, 17.2-2-A, and 17.3-1-A. FSAR Appendix 17AA includes the Fermi 3 QAPD applicable to activities that adapt the design to plant-specific implementation, construction, and operations. The applicant states that the Black and Veatch (B&V) 10 CFR Part 50, Appendix B/NQA-1 QA Program is used for safety-related COL application preparation activities

and delegated quality functions. Initially, Detroit Edison controlled these activities contractually; then under the Nuclear Development (ND) QA Program Description (ND QAPD) as it was implemented; and finally under the Fermi 3 QAPD (after September 18, 2008).

The staff evaluated and determined that the Fermi 3 QAPD meets NRC regulatory requirements by adhering to the guidance of SRP Section 17.5. SRP Section 17.5 provides a QA Program outline acceptable to the staff for the preparation of the DCD, ESP, and COL applications.

Additionally, the staff finds that the Fermi 3 QAPD appropriately addresses site- and plant-specific COL Items EF3 COL 17.2-1-A, EF3 COL 17.2-2-A, and EF3 COL 17.3.1-A.

Supplemental information

- EF3 SUP 17.5-2

This supplemental information (EF3 SUP 17.5-2) describes the QA Programs that applied to the Fermi 3 COL application and supported activities through late 2009. The applicant states that (1) Detroit Edison contractually delegated the work of establishing and executing the QA Program to B&V for development activities related to the COL application and secured the services of an Owner's Engineer to support owner-related activities; (2) COL application development commenced under the B&V 10 CFR Part 50, Appendix B/NQA-1 QA Program; (3) subsequent to contracting with B&V, Detroit Edison developed the ND QAPD and procedures for implementing those elements of the ND QAPD associated with the activities Detroit Edison had planned to perform at the time (e.g., review of the B&V COL application work product); (4) the Fermi 3 QAPD (FSAR Chapter 17, Appendix 17AA) supersedes the ND QAPD and applies to activities after the application to adapt the design to specific plant implementation, construction, and operations; and (5) Detroit Edison continued to delegate the execution of quality- and safety-related services associated with the COL application revision and to review support to the B&V 10 CFR Part 50, Appendix B/NQA-1 QA Program under the Fermi 3 QAPD.

In RG 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," Regulatory Position C.I.17.5.3 states that the FSAR should describe how the applicant will retain responsibility for and maintain control over those portions of the QA Program that are delegated to other organizations. To clarify whether the applicant meets the expectations of RG 1.206, the staff used a combination of licensing reviews (RAIs) and inspection activities. For the licensing review, the staff issued RAI 17.05-3 and RAI 17.05-4 requesting the applicant to describe how the applicant retains responsibility for and maintains control over those portions of the QA Program delegated to B&V. The RAIs also asked for a description of how the applicant will verify the effective implementation of delegated QA functions and the expected scope of work for each QAPD. For inspections, the staff conducted a limited scope inspection at the Detroit Edison facility in Detroit, Michigan, in August 2009. The purpose of the NRC inspection was to verify that the applicant had effectively implemented the QA processes and procedures related to the Fermi 3 COL FSAR.

Inspection report, initial Notice of Violation (NOV), and applicant's responses

The staff documented the Fermi 3 inspection and three violations of regulatory requirements in Inspection Report Number 05200033/2009-201 on October 5, 2009 (ADAMS Accession No. ML092740064). The applicant's letter dated November 9, 2009 (ADAMS Accession No. ML093160318), responding to the Inspection Report contested all violations based in part on (a) Detroit Edison was not an applicant until September 18, 2008; and (b) the cited

requirements from the Fermi 3 QAPD and implementation procedures were not enforceable, because they had not been accepted by the NRC or incorporated into a license condition.

Revised NOV and resolution of applicant's responses

The staff reviewed the applicant's responses to the inspection report and, after consultation with the NRC Office of Enforcement (OE) and Office of the General Counsel (OGC), the staff issued a revised NOV in a letter on April 27, 2010 (ADAMS Accession No. ML100330687). The staff stated in the revised NOV letter that the applicant must demonstrate compliance with Appendix B in order to receive a COL, and the staff cannot issue a NOV for actions or omissions that occurred before the applicant had submitted the Fermi 3 COL application to the NRC. As the result of the OE and OGC consultation, the staff modified the initial NOV and issued a revised NOV that identified two violations of NRC requirements for activities performed after the date of the COL application (September 18, 2008). For activities occurring before the date of the COL application, the staff issued a series of RAIs (as outlined below) to evaluate the applicant's control over QA Program elements delegated to other organizations and compliance with Appendix B.

The first violation cited the applicant for failing to perform an evaluation of the B&V QA Program and to adequately document the basis for qualifying B&V to perform safety-related Fermi 3 COL activities. The second violation cited the applicant for failing to complete internal audits of applicable QA programmatic areas and for failing to document any trending evaluations conducted to identify and correct recurring conditions adverse to quality for Fermi 3 COL application activities, in accordance with applicable applicant procedures.

Resolution of inspection violations

The applicant responded to the first violation in a letter dated May 26, 2010 (ADAMS Accession No. ML101480046). In that letter, the applicant acknowledges the violation and outlines the corrective steps taken and results achieved to address the concerns noted in the violation. Specifically, the applicant (1) has initiated a plan to establish a more comprehensive vendor qualification review and acceptance program; (2) has conducted an audit of B&V that verified the effective implementation of the B&V QA Program for Fermi 3 COL application activities; and (3) has confirmed that the safety-related activities performed by B&V before the B&V audit were completed in accordance with the 10 CFR Part 50, Appendix B requirements.

The staff accepted the applicant's response to the second violation based on the applicant's original inspection report reply letter dated November 9, 2009 (ADAMS Accession No. ML093160318). In that letter, the applicant outlines the corrective steps and the results achieved to address the concerns noted in the violation and assures the staff that all COL application activities continue to be conducted at a level of quality necessary to support future safety-related activities. Specifically, the applicant (1) conducted an internal audit; (2) updated the applicable implementation procedures for reviewing potential Corrective Action Report (CAR) trends; and (3) documented a trend review of all ND CARs

The staff reviewed the applicant's letters, the reasons for the violations, the corrective steps implemented, and the results achieved. The staff finds that (a) the letters were responsive to the revised NOV, (b) the implemented corrective actions were appropriate; and (c) the activities cited in the revised NOV are again consistent with the requirements of Appendix B to 10 CFR Part 50. The staff documented the acceptance of the applicant's responses to the revised NOV in a letter dated June 4, 2010 (ADAMS Accession No. ML101530596).

Resolution of staff RAIs

The staff received the applicant's responses to RAI 17.05-3 and RAI 17.05-4 in a letter dated September 30, 2009 (ADAMS Accession No. ML092790561). In these responses, the applicant separates the Fermi 3 project into three distinct periods and discusses the project for each period beginning with the inception of the project in 2007. The responses also provide additional information on the previous and expected scope of work for the various QAPDs.

The staff reviewed the applicant's letter and determined that the applicant's responses to RAIs 17.05-3 and 17.05-4 had led to a better understanding of the history of the Fermi 3 project, but they did not fully address the four attributes in Regulatory Position C.I.17.5.3 of RG 1.206. As a result, the staff issued RAI 17.05-19 requesting the applicant to describe how the four attributes in RG 1.206 Regulatory Position C.I.17.5.3 were met for each of the three distinct project periods of the Fermi 3 project. Additionally, to determine whether Fermi 3 safety-related activities are consistent with the requirements of Appendix B to 10 CFR Part 50, the staff issued RAI 17.05-16 through RAI 17.05-18, which requested detailed information regarding QA activities that were taking place before the Fermi 3 COL application submittal date of September 18, 2008.

The staff received the applicant's responses to RAI 17.05-16 through RAI 17.05-19 in a letter dated May 10, 2010 (ADAMS Accession No. ML101320254). In these responses, the applicant provides amplifying details associated with the conduct and development of the safety-related COL application sections for the Fermi 3 project, from its January 2007 inception to the present.

In the responses to RAI 17.05-16 through RAI 17.05-18, the applicant provides detailed information outlining QA support for Fermi 3 safety-related activities completed before the Fermi 3 COL application date. The applicant also outlines proposed changes to the Fermi 3 FSAR. Specifically, the applicant provides (1) a list of safety-related activities and safety-related COL application sections; (2) dates of the activity or section creation; (3) the contracting entity conducting the activity/section creation and governing the QAPD; (4) the QA organization responsible for oversight of the activity/section creation; (5) dates and type of any specific contractor conducting the QA oversight activities (e.g., surveillance, document review, etc.); (6) contractor approval date; (7) dates of applicant's review and approval; (8) dates and type of any specific applicant QA oversight activities (e.g., surveillance, document review, etc.); (9) background personnel information (including QA qualification types, type of QA support provided, and number of support hours) for both applicant and contractor organizations; and (10) a summary of the various versions of the Fermi 3 QAPD and the implementation procedures.

Additionally, in the response to RAI 17.05-19, the applicant provides detailed information outlining how the Fermi 3 project meets the four attributes in RG 1.206, Regulatory Position C.I.17.5.3 for each of the three distinct project periods. Specially, the applicant's response describes (1) how the applicant retains responsibility for and maintains control over those portions of the QA Program delegated to other organizations; (2) the responsible organization and the process for verifying that delegated QA functions are being effectively implemented; (3) the major work interfaces for activities affecting QA; and (4) how clear and effective lines of communication between the applicant and the principal contractors are maintained to assure coordination and control of the QA Program.

The staff evaluated the applicant's RAI response letters; proposed changes to FSAR Table 1.9-203, "Conformance with the FSAR Content Guidance in RG 1.206"; changes to FSAR

Chapter 17.5; the various Fermi 3 inspection-related documents mentioned above to determine whether the applicant has maintained control over QA Program elements delegated to other organizations; and whether safety-related activities for the Fermi 3 project are in compliance with Appendix B. In the process of the evaluation, the staff determined that Fermi 3 project control (oversight) of QA Program elements delegated to other organizations (contracted activities) may affect compliance with Appendix B for safety-related activities. NRC quality program requirements differ based on when the activities occurred—before or after the date of the COL application.

Staff conclusions for pre-application activities

For activities occurring before the date of the COL application, the staff determined that the applicant had contractually delegated to B&V the tasks of establishing and executing a QA Program and thus satisfied the requirements of 10 CFR Part 50, Appendix B for COL application development. Furthermore, the staff determined that because B&V had an established 10 CFR Part 50, Appendix B and ASME NQA-1 Program, internal oversight of safety-related activities was inherent in the B&V program. The staff also determined that the applicant was not required to implement a QA Program in compliance with the Appendix B criterion. However, the applicant did establish applicable portions of an Appendix B program by creating the ND QAPD and by creating procedures for implementing those elements of the ND QAPD associated with the planned activities in support of the review and acceptance of the B&V COL application work product. Furthermore, the staff determined that the applicant was not required to provide specific quality oversight measures; although the ND QAPD and associated implementation procedures had provided additional measures of oversight beyond the applicant's commercial contractual oversight.

As a result, the staff finds that the applicant has provided adequate assurance that the requirements of Appendix B have been met for safety-related activities supporting the Fermi 3 COL application by appropriately contracting with B&V and by providing satisfactory commercial oversight of contracted activities occurring before the date of the COL application.

Staff conclusions for post-application activities

For activities occurring after the date of the COL application, the staff determined that the applicant has continued to contractually delegate safety-related activities to B&V in support of the Fermi 3 project, and these activities continued to be performed under the B&V QA Program. However, the applicant now controlled safety-related activities under the Fermi 3 QAPD. Details of the staff's review of the programmatic aspects of the Fermi 3 QAPD are included above (see Subsections 17.5.4.1 through 17.5.4.21). The staff verified by inspection the implementation of the Fermi 3 QAPD.

After reviewing the applicant's responses to RAI 17.05-16 through RAI 17.05-19, the proposed changes to the FSAR, and the various Fermi 3 inspection-related documents mentioned above, the staff finds that for safety-related activities occurring after the date of the COL application, the applicant has provided adequate assurance that the Fermi 3 project has met the requirements of Appendix B by establishing and implementing the Fermi 3 QAPD. The staff also finds that the applicant has provided satisfactory oversight of the contracted activities by implementing the applicable oversight components of the QA Program.

Furthermore, the staff evaluated and determined that the changes to the FSAR are acceptable because they adequately resolve the above RAIs. The staff verified that the applicant's

proposed changes are included in the COL application, Revision 3. Therefore, RAI 17.05-3, RAI 17.05-4, and RAIs 17.05-16 through 17.05-19 are closed.

17.5.5 Post Combined License Activities

There are no post COL activities related to this section.

17.5.6 Conclusion

NRC staff reviewed Section 17.5 of the Fermi 3 COL FSAR and the Fermi 3 QAPD. The staff's review of the Fermi 3 QAPD is based on the review guidance of SRP Section 17.5 and the requirements of 10 CFR 52.79(a)(17);10 CFR 52.79(a)(25); 10 CFR 52.79(a)(27); and 10 CFR Part 50, Appendix B.

NRC staff reviewed the Fermi 3 COL FSAR and the Fermi 3 QAPD and finds the following:

- The QAPD provides adequate guidance for Detroit Edison to describe the authority and responsibility of management and supervisory personnel, performance/verification personnel, and self-assessment personnel.

- The QAPD provides adequate guidance for Detroit Edison to provide for organizations and persons to perform verification and self-assessment functions with the authority and independence to conduct their activities without undue influence from those directly responsible for costs and schedules.

- The QAPD provides adequate guidance for Detroit Edison to apply a QAPD to activities and items that are important to safety.

- The QAPD provides adequate guidance for Detroit Edison to establish controls that, when properly implemented, comply with 10 CFR Part 52, Appendix B to 10 CFR Part 50, 10 CFR Part 21, and 10 CFR 50.55(e); with the acceptance criteria associated with Section 17.5 of NUREG–0800; and with the commitments to the applicable regulatory guidance.

The Detroit Edison Fermi 3 QAPD addresses site- and plant-specific COL Items EF3 COL 17.2-1-A, EF3 COL 17.2-2-A, and EF3 COL 17.3.1-A.

Based on the information provided by the applicant, the staff finds that Section 17.5 of the Fermi 3 COL FSAR and the Fermi 3 QAPD meet the requirements of Appendix B to 10 CFR Part 50; 10 CFR 52.79(a)(17); 10 CFR 52.79(a)(25); and 10 CFR 52.79(a)(27) and are therefore acceptable.

17.6 Maintenance Rule Program

17.6.1 Introduction

This FSAR section addresses the program for MR implementation based on the requirements of 10 CFR 52.79(a)(15) and 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants"; and on the guidance in RG 1.160, Revision 3. RG 1.160 endorses Nuclear Management and Resource Council (NUMARC) 93–01, Revision 4A,

"Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," which provides one acceptable method for implementing the MR.

17.6.2 Summary of Application

In Fermi 3 COL FSAR Section 17.6, Revision 7, the applicant provides the following:

COL Items

- STD COL 17.4-2-A Maintenance Rule Program

In FSAR Section 17.6, the applicant incorporates by reference NEI 07-02A, "Generic FSAR Template Guidance for Maintenance Rule Program Description for Plants Licensed Under 10 CFR Part 52," with supplemental information.

Supplemental Information

- STD SUP 17.6-1

In FSAR Section 17.6, the applicant states:

> The text of the template provided in NEI 07-02A is generically numbered as "17.X." When the template is incorporated by reference into this section, numbering is changed from "17.X" to "17.6."

- STD SUP 17.6-2

In FSAR Section 17.6.3, "Maintenance Rule Program Relationship with Reliability Assurance Activities," the applicant states:

> Reliability during the operations phase is assured through the implementation of operational programs, i.e., the MR Program (Section 17.6), the Quality Assurance Program (Section 17.5), the Inservice Inspection Program (Subsection 5.2.4, Section 6.6, and Subsection 3.8.1.7.3), and the Inservice Testing Program (Subsection 3.9.6, and Subsection 3.9.3.7.1(3)e), as well as the Technical Specifications Surveillance Requirements (Chapter 16), and maintenance programs.

- STD SUP 17.6-3

In FSAR Subsection 17.6.1.1, "Maintenance Rule Scoping per 10 CFR 50.65(b)," the applicant states:

> In Paragraph 17.6.1.1.b, replace "(DRAP - see FSAR Section 17.Y)" with the following text "(See Section 17.4)".

- STD SUP 17.6-4

In FSAR Section 17.6.4, "Maintenance Rule Program Relationship with Industry Operating Experience Activities," the applicant states:

Condition monitoring of underground or inaccessible cables is incorporated into the MR Program. The cable condition monitoring program incorporates lessons learned from industry operating experience (e.g., GL 2007-01, NUREG/CR-7000), addresses regulatory guidance, and utilizes information from detailed design and procurement documents to determine the appropriate inspections, tests and monitoring criteria for underground and inaccessible cables within the scope of the maintenance rule (10 CFR 50.65).

17.6.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in the NRC final safety evaluation for NEI 07–02A, Revision 0 (Corrected), dated January 24, 2008 (ADAMS Accession No. ML073650081). NEI 07-02A, Revision 0, provides a complete generic program description for developing the section of the COL FSAR associated with Section 17.6 of NUREG–0800.

In addition, the regulatory basis for accepting the MR Program is in the following:

- 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants"
- 10 CFR 52.79(a)(15), which requires a COL FSAR to contain a description of the program and its implementation for monitoring the effectiveness of maintenance necessary to meet the requirements of 10 CFR 50.65
- RG 1.206, Regulatory Position C.I.17.6, "Description of the Applicant's Program for Implementation of 10 CFR 50.65, the Maintenance Rule"

17.6.4 Technical Evaluation

The staff reviewed Section 17.6 of the Fermi 3 COL FSAR and checked the referenced Topical Report NEI 07-02A template guidance to ensure that the combination of the information in the COL FSAR and the information in the NEI 07-02A report appropriately represents the complete scope of information relating to this review topic. The staff's review confirmed that the information in the application and the information incorporated by reference address the required information relating to this MR Program.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

COL Items

- STD COL 17.4-2-A Maintenance Rule Program

The applicant incorporates by reference NEI 07-02A with the following supplemental information. The text in the NEI template guidance is generically numbered as "17.X." The staff approved this template for FSAR Section 17.6 with site-specific input (ADAMS Accession No. ML073650081).

Supplemental Information

- STD SUP 17.6-1

Because the NEI template guidance is generically numbered as "17.X," the applicant has appropriately changed the numbering from "17.X" to "17.6." The staff finds this change acceptable.

- STD SUP 17.6-2

In FSAR Section 17.6.3, the applicant specifies the various FSAR sections that discuss the relationship of the MR Program to the RAP activities. The applicant states that the reliability of the SSCs during the operations phase is assured through the implementation of the MR Program in Section 17.6; the QA Program in Section 17.5; the Inservice Inspection Program in Section 5.2.4, Section 6.6, and Subsection 3.8.1.7.3; the Inservice Testing Program in Section 3.9.6 and Subsection 3.9.3.7.1(3)e; the Technical Specifications Surveillance Requirements in Chapter 16; and maintenance programs. The staff finds that the applicant has adequately addressed this information in FSAR Section 17.6.3.

- STD SUP 17.6-3

Because the NEI template guidance is generically numbered as "17.X" in Paragraph 17.6.1.1.b, the applicant appropriately replaces "(DRAP - see FSAR Section 17.Y)" with the following text, "(See Section 17.4)." The staff finds this change acceptable.

- STD SUP 17.6-4

In FSAR Section 17.6.4, the applicant provides supplemental information that discusses the MR Program relationship with the industry operating experience activities. In this section, the applicant incorporates condition monitoring of underground or inaccessible cables into the MR Program. The applicant states that the Cable Condition Monitoring Program (1) incorporates lessons learned from industry operating experience (e.g., GL 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," and NUREG/CR–7000, "Essential Elements of an Electric Cable Condition Monitoring Program"); (2) addresses regulatory guidance; and (3) uses detailed design and procurement information to establish appropriate inspections, tests, and monitoring criteria for underground and inaccessible cables within the scope of the MR (10 CFR 50.65).

The staff evaluated this information as part of the underground electrical cable monitoring program in Section 8.2.4 of this SER. The staff's review finds that the applicant's Cable Condition Monitoring Program is acceptable because it satisfies the recommendations of GL 2007-1; the guidance of NUREG/CR–7000; and the guidance of SRP Section 8.2, Review Procedure 1.L.

In addition, the staff reviewed Fermi 3 COL FSAR, Table 13.4-201, "Operational Programs Required by NRC Regulations." The staff determined that the applicant has identified the MR Program and its associated implementation milestones. The License Condition for the operational program implementation schedule, which includes the MR Program, is in Section 13.4.4, "Post Combined License Activities," of this SER.

The staff finds that the applicant's information in FSAR Section 17.6 meets the NRC requirements and is thus acceptable.

17.6.5 Post Combined License Activities

The License Condition for the operational program implementation schedule, which includes the Maintenance Rule Program, is in Section 13.4.4, "Post Combined License Activities," of this SER.

17.6.6 Conclusion

NRC staff reviewed and approved NEI 07–02A for use as a generic FSAR template for the development of the MR Program. The staff reviewed the application and checked the referenced NEI 07–02A template guidance. The staff's review confirms that the applicant has addressed the required information relating to the MR Program, and no outstanding information is expected to be addressed in the COL FSAR related to this section.

In addition, the staff compared the supplemental information in the COL application to the relevant NRC regulations, the guidance in Section 17.6 of NUREG–0800, and other NRC RGs. The staff's review finds that the applicant has provided adequate information to address COL Item STD COL 17.4-2-A. Therefore, the staff finds that the information in Section 17.6 of the Fermi 3 COL FSAR is acceptable and meets the requirements of 10 CFR 52.79(a)(15) and 10 CFR 50.65.

18.0 HUMAN FACTORS ENGINEERING

18.1 Introduction

This chapter describes the staff's evaluation of the Fermi 3 Human Factors Engineering (HFE) design. This includes the human-system interface (HSI) design development, the HSI design goals and bases, the standard HSI design features, and the detailed HSI design and implementation process, with embedded design acceptance criteria, for the Economic Simplified Boiling-Water Reactor (ESBWR).

18.2 Summary of Application

Chapter 18 of the Fermi 3 combined license (COL) Final Safety Analysis Report (FSAR) Revision 7 incorporates by reference Chapter 18 of the certified ESBWR design control document (DCD), Revision 10, with no departures and one supplement. In addition, in FSAR Section 18.13, "Human Performance Monitoring," the applicant provides the following:

COL Item

- STD COL 18.13-1-A — Milestone for Human Performance Monitoring Implementation.

The COL applicant is responsible for providing a milestone for the implementation of the Human Performance Monitoring (HPM) Program. The applicant commits (COM18.13-001) to implement the HPM Program before the beginning of the first licensed operator training class.

18.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor Standard Design," (Agencywide Documents Access and Management System Accession No. ML14100A304). In addition, the relevant requirements of the Commission regulations for the HFE, and the associated acceptance criteria, are in Chapter 18 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," the Standard Review Plan (SRP).

18.4 Technical Evaluation

As documented in NUREG–1966, the U.S. Nuclear Regulatory Commission (NRC) staff reviewed and approved Chapter 18 of the certified ESBWR DCD. The staff reviewed Chapter 18 of the Fermi 3 COL FSAR and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The NRC staff's review confirms that the information in the application and the information incorporated by reference address the required information related to HFE.

The staff reviewed the information in the Fermi 3 COL FSAR as follows:

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

COL Item

- COL STD 18.13-1-A — Milestone for Human Performance Monitoring Implementation.

The applicant commits (COM 18.13-001) to implement an HPM Program before beginning of the first licensed operator training class.

In ESBWR DCD Revision 10, Section 18.13.3, "Elements of Human Performance Monitoring Process" states that the HPM strategy is implemented through the use of a representative training simulator during periodic training exercises.

Senior reactor operator and reactor operator licensing requires the use of a full scope training simulator to develop and demonstrate operating competencies. By implementing the monitoring program at the beginning of the first licensing class, the COL applicant has selected the earliest opportunity subsequent to the completion of the HFE design verification and validation to begin collecting performance information. Accordingly, the staff finds that the applicant has adequately addressed this COL item.

18.5 Post Combined License Activities

The applicant identified the following commitment:

- Commitment (COM 18.13-001) – The HPM program will be implemented prior to the beginning of the first licensed operator training class.

18.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this chapter. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 52.63(a)(5) and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix E, "Design Certification Rule for the Economic Simplified Boiling-Water Reactor," Section VI.B.1, all nuclear safety issues relating to HFE that were incorporated by reference are resolved.

In addition, the staff compared the additional COL information in the application to the relevant NRC regulations, the guidance in Chapter 18 of NUREG–0800, and other NRC regulatory guides. The staff's review concludes that the applicant has adequately addressed COL Item COL STD 18.13-1-A.

19.0 PROBABILISTIC RISK ASSESSMENT AND SEVERE ACCIDENTS

This chapter describes the Fermi 3 plant-specific probabilistic risk assessment (PRA) and severe accident evaluations and corresponding regulatory requirements. In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 52.79(a)(46), a combined license (COL) application is required to contain a description of the plant-specific PRA and its results. In addition,10 CFR 52.79(d)(1) specifies that if the COL application references a design certification (DC), then plant-specific PRA information must use the PRA information for the DC and be updated to account for site-specific design information and any design changes or departures. The PRA provides an evaluation of the risk of core damage and release of radioactive material associated with both internal and external events that can occur during plant operation at power or while shut down.

Attachment 19.A "Loss of Large Areas of the Plant due to Explosions or Fire" (public-version) to this section of the Safety Evaluation Report (SER) evaluates the measures identified by the applicant that are needed to comply with requirements to address the loss of large areas of the plant due to explosions or fires from a beyond-design-basis event (BDBE). The U.S. Nuclear Regulatory Commission (NRC) regulations in 10 CFR 50.54(hh)(2) and 10 CFR 52.80(d) describe these requirements. It should be noted that the non-public Attachment 19.B "Loss of Large Areas of the Plant due to Explosions or Fire," as well as some documents referenced in Attachment 19.A, include security-related or safeguards information. Therefore, Attachment 19.B, and the references that include security-related or safeguards information are withheld from the public in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding."

19.1 Introduction

This section describes the objectives of the design-specific PRA and severe accident evaluations, and the corresponding regulatory requirements. Section 19.1, "Introduction" of the Fermi 3 COL Final Safety Analysis Report (FSAR), Revision 7, incorporates by reference, with no departures or supplements, Section 19.1 "Introduction" of the Economic Simplified Boiling-Water Reactor (ESBWR) Design Control Document (DCD), Revision 10.

As documented in NUREG–1966 "Final Safety Evaluation Report related to the Certification of the Economic Simplified Boiling-Water Reactor Standard Design," the NRC staff reviewed and approved Section 19.1 of the certified ESBWR DCD. The staff reviewed the application and checked the referenced DCD to ensure no issue relating to this section remained for review.[1] The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix E, Section VI.B.1, all nuclear safety issues relating to the "Introduction" section, that were incorporated by reference have been resolved.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

19.2 PRA Results and Insights

19.2.1 Introduction

This section of the safety evaluation report (SER) addresses the results and insights from the Fermi 3 plant-specific PRA, which are documented in Section 19.2 of the Fermi 3 COL FSAR, Revision 7.

19.2.2 Summary of Application

Section 19.2 of the COL FSAR incorporates by reference Section 19.2 of the certified ESBWR DCD, Revision 10. In addition, in FSAR Subsection 19.2.3.2.4 "Evaluation of External Event Seismic," the applicant provides the following:

COL Item

- STD COL 19.2.6-1-A — Seismic High Confidence Low Probability of Failure Margins

In FSAR Subsection 19.2.3.2.4, the applicant provides information to address DCD COL Item 19.2.6-1-A, "Seismic High Confidence Low Probability of Failure Margins." The applicant stated that an analysis of as-built structure, system, and component (SSC) high confidence in low probability of failure (HCLPF) will be performed before fuel load and will be compared to those values assumed in the ESBWR seismic margin analysis to determine if any new vulnerabilities have been introduced.

19.2.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the relevant requirements of the Commission regulations for PRA results, and the associated acceptance criteria, are in Chapter 19 of NUREG–0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, (LWR Edition)," the Standard Review Plan (SRP).

Also, the NRC staff followed the guidance in Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear power Plants (LWR Edition)," in evaluating Femi 3 FSAR, Section 19.2 for compliance with NRC regulations.

19.2.4 Technical Evaluation

As documented in NUREG–1966, the NRC staff reviewed and approved Section 19.2 of the certified ESBWR DCD. The staff reviewed Section 19.2 of the Fermi 3 COL FSAR, Revision 7, and checked the referenced ESBWR DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that information in the application and the information incorporated by reference address the required information related to PRA results and insights.

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

The staff reviewed the following information in the COL FSAR:

- STD COL 19.2.6-1-A — Seismic High Confidence Low Probability of Failure Margins

The applicant provided the following information to address DCD COL Information Item 19.2.6-1-A:

> As-built SSC HCLPFs will be compared to those assumed in the ESBWR seismic margin analysis shown in DCD Table 19.2-4. Deviations from the HCLPF values or other assumptions in the seismic margins evaluation will be analyzed to determine if any new vulnerabilities have been introduced. This comparison and analysis will be completed prior to fuel load.[COM19.2-001]

ESBWR DCD Tier 2, Section 19.2.6, Revision 10, describes this COL Information item. In the response to request for additional information (RAI) 19.02-92 (Agencywide Documents Access and Management Systems (ADAMS) Accession No. ML081270301) for Chapter 19 of the ESBWR DCD, Tier 2, General Electric-Hitachi revised DCD Table 19.2-4 to clarify that the safe-shutdown earthquake for HCLPF values is the ESBWR certified seismic design response spectrum (CSDRS). Therefore, the COL applicant will confirm the HCLPFs for SSCs in DCD Table 19.2-4 with respect to the ESBWR CSDRS. This comparison and the analysis will be completed prior to fuel load. Therefore, the NRC staff finds that the reference to the applicable section of the ESBWR DCD and the guidance provided in NUREG-0800 and RG 1.206 are met, and therefore is acceptable.

19.2.5 Post-Combined License Activities

The applicant identified the following commitment to address COL Item 19.2.6-1-A:

- Commitment (COM 19.2-001) – As-built SSC HCLPF values will be compared to those assumed in the ESBWR seismic margin analysis. Deviations from the HCLPF values or other assumptions in the seismic margins evaluation will be analyzed to determine if any new vulnerabilities have been introduced. This comparison and analysis will be completed before fuel load.

19.2.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–1966. The NRC staff reviewed the application and checked the referenced DCD. The staff's review finds that the applicant has addressed the required information relating to PRA results and insights, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues related to PRA Results and Insights, that were incorporated by reference are resolved.

In addition, the staff compared the additional information in the application to the relevant NRC regulations, the guidance in Chapter 19 of NUREG-0800, and other NRC regulatory guides. The staff's review finds that the applicant has presented adequate information in Fermi Unit 3 COL FSAR, and is therefore, acceptable.

19.3 Severe Accident Evaluations

Section 19.3, "Severe Accident Evaluations" of the Fermi Unit 3 COL FSAR, Revision 7, incorporates by reference, Section 19.3, "Severe Accident Evaluations" of the ESBWR DCD, Revision 10, with no departures or supplements. As documented in NUREG–1966, the NRC staff reviewed and approved Section 19.3 of the certified ESBWR DCD. The staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remained for review.[1] The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues related to Severe Accident Evaluations, that were incorporated by reference have been resolved.

19.4 PRA Maintenance

Section 19.4, "PRA Maintenance" of the Fermi 3 COL FSAR, Revision 7, incorporates by reference, with no departures or supplements, Section 19.4, "PRA Maintenance" of the ESBWR DCD, Revision 10.

As documented in NUREG–1966, the NRC staff reviewed and approved Section 19.4 of the certified ESBWR DCD. The staff reviewed the application and checked the referenced DCD to ensure that the combination of the information in the ESBWR DCD and the information in the COL FSAR no issue relating to this section remained for review.[1] The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues related to PRA Maintenance that were incorporated by reference have been resolved.

19.5 Conclusions

19.5.1 Introduction

The PRA and severe accident evaluations contained in Chapter 19 demonstrate that the ESBWR is designed with state-of-the-art safety features that have high reliability and availability with significant redundancy and diversity.

19.5.2 Summary of Application

Section 19.5 of the Fermi 3 COL FSAR incorporates by reference Section 19.5 of the ESBWR DCD Tier 2, Revision 10.

In addition, in FSAR Section 19.5, the applicant provides the following information:

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

Supplemental Information

- EF3 SUP 19.5-1

In FSAR Section 19.5, the applicant stated that it reviewed site and plant-specific information to determine if any changes from the certified design PRA were warranted.

19.5.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the regulatory basis for requiring the supplementary information on consideration of site-specific and plant-specific information and design features is established in 10 CFR 52.79(a)(46) and in 10 CFR 52.79(d)(1), which requires (1) COL applicants referencing a certified design to include, in the FSAR, information sufficient to demonstrate that the site characteristics fall within the site parameters specified in the design certification, and (2) plant-specific PRA information in a COL application that references a standard design certification must use the PRA information from the design certification and must be updated to account for site-specific design information and any design changes or departures. Consistent with 10 CFR 50.71(h), each COL holder shall maintain and upgrade the PRA. The upgraded PRA must cover initiating events and modes of operation contained in NRC-endorsed consensus standards on PRA in effect one year before each required upgrade.

19.5.4 Technical Evaluation

As documented in NUREG–1966, the NRC staff reviewed and approved Section 19.5 of the certified ESBWR DCD. The staff reviewed Section 19.5 of the Fermi Unit 3 COL FSAR and checked the referenced DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The NRC staff's review confirmed that the information in the application and the information incorporated by reference address the required information related to this section.

In addition, the NRC staff reviewed Part 4 of the Fermi 3 COL FSAR, which includes the technical specifications (TS). The staff's review determined that the ESBWR generic TS and the bases of the referenced certified design are incorporated by reference into the Fermi 3 plant-specific TS with only minor modifications that would not impact the plant-specific PRA.

The staff reviewed the following information in the COL FSAR:

Supplemental Information

- EF3 SUP 19.5-1

In Section 19.5 of the FSAR, the applicant stated the following in support of the assertion that it has met the requirement in 10 CFR 52.79(a)(46) for a description of the plant-specific PRA and its results:

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

The review of site-specific information and plant-specific design information determined that (1) the PRA bounds site-specific and plant-specific design parameters and design features and (2) these parameters and features have no significant impact on the DCD PRA results and insights.

In order to confirm the validity of the applicant's assertion, the staff issued RAI 19-1 (ADAMS Accession No. ML090140336) requesting the applicant to provide additional information about the site-specific and plant-specific design parameters and design features and explain how the site-specific and plant-specific design parameters and design features were bounded by the DCD PRA. The applicant provided the response to these questions in letters dated February 16, 2009 (ADAMS Accession No. ML090610219) and December 21, 2009 (ADAMS Accession No. ML093570130). In these responses, the applicant described the key site-specific parameters and features considered in its evaluation and provided a summary of the evaluation for each specific parameter or feature. The applicant incorporated their response into Appendix 19AA "Summary of Plant-Specific PRA Review" of the FSAR. Therefore, RAI 19-1 is resolved. The staff's technical evaluation section of Appendix 19AA of this report discusses supplemental information provided in EF3 SUP 19.5-1 and EF3 SUP 19.5-2.

19.5.5 Post Combined License Activities

There are no post COL activities related to this section.

19.5.6 Conclusion

The NRC staff's findings related to information incorporated by reference are in NUREG–1966. The NRC staff reviewed the application and checked the referenced DCD. The staff's review finds that the applicant has addressed the required information and that there is no outstanding information expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to this section that were incorporated by reference have been resolved.

As discussed in Appendix 19AA of this SER, the applicant's response to RAI 19-1 addresses the staff's concerns adequately. Based on the above, staff concludes that the applicant information to address supplemental information item EF3 SUP 19.5-1 as provided in COL FSAR meets the relevant guidelines in SRP Chapter 19 of NUREG–0800, and other NRC RGs, and is therefore, acceptable.

Appendix 19A Regulatory Treatment of Non-Safety Systems (RTNSS)

Appendix 19A, "Regulatory Treatment of Non-Safety Systems" of the Fermi Unit 3 COL FSAR, Revision 7, incorporates by reference, Appendix 19A, "Regulatory Treatment of Non-Safety Systems" of the ESBWR DCD, Revision 10, with no departures or supplements.

As documented in NUREG–1966, the NRC staff reviewed and approved Appendix 19A of the certified ESBWR DCD. The staff reviewed Appendix 19A and checked the referenced DCD to ensure that no issue relating to this appendix remained for review.[1] The staff's review confirmed

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this appendix. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues related to this appendix that were incorporated by reference have been resolved.

Appendix 19ACM Availability Controls Manual

Appendix 19ACM, "Availability Controls Manual" of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Appendix 19ACM, "Availability Controls Manual" of the ESBWR DCD, Revision 10 with no departures or supplements.

As documented in NUREG–1966, the NRC staff reviewed and approved Appendix 19ACM of the certified ESBWR DCD. The staff reviewed Appendix 19ACM and checked the referenced DCD to ensure that no issue relating to this appendix remained for review.[1] The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this appendix. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues related to this appendix that were incorporated by reference have been resolved.

Appendix 19B Deterministic Analysis for Containment Pressure Capability

Appendix 19B, "Deterministic Analysis for Containment Pressure Capability" of the Fermi 3 COL FSAR, Revision 7, incorporates by reference Appendix 19B, "Deterministic Analysis for Containment Pressure Capability" of the ESBWR DCD, Revision 10, with no departures or supplements.

As documented in NUREG–1966, the NRC staff reviewed and approved Appendix 19B of the certified ESBWR DCD. The staff reviewed Appendix 19B and checked the referenced DCD to ensure that no issue relating to this appendix remained for review.[1] The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this appendix. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues related to this appendix that were incorporated by reference have been resolved.

Appendix 19C Probabilistic Analysis for Containment Pressure Fragility

Appendix 19C, "Probabilistic Analysis for Containment Pressure Fragility" of the Fermi Unit 3 COL FSAR, Revision 7, incorporates by reference Appendix 19B, "Probabilistic Analysis for Containment Pressure Fragility" of the ESBWR DCD, Revision 10, with no departures or supplements.

As documented in NUREG–1966, the NRC staff reviewed and approved Appendix 19C of the certified ESBWR DCD. The staff reviewed Appendix 19C and checked the referenced DCD to ensure that no issue relating to this appendix remained for review.[1] The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this appendix. Pursuant to 10 CFR

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues related to this appendix that were incorporated by reference have been resolved.

Appendix 19D Assessment of Malevolent Aircraft Impact

Appendix 19D, "Assessment of Malevolent Aircraft Impact" of the Fermi Unit 3 COL FSAR, Revision 7, incorporates by reference Appendix 19D, "Assessment of Malevolent Aircraft Impact" of the ESBWR DCD, Revision 10, with no departures or supplements.

As documented in NUREG–1966, the NRC staff reviewed and approved Appendix 19D of the certified ESBWR DCD. The staff reviewed Appendix 19D and checked the referenced DCD to ensure that no issue relating to this appendix remained for review.[1] The staff's review confirmed that the applicant has addressed the required information, and no outstanding information is expected to be addressed in the COL FSAR related to this appendix. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues related to this appendix that were incorporated by reference have been resolved.

Appendix 19AA Summary of Plant-Specific PRA Review

19AA.1 Introduction

In accordance with 10 CFR 52.79(a)(46), this FSAR appendix provides a summary of plant-specific PRA and its results.

19 AA.2 Summary of Application

Appendix 19AA of the Fermi 3 COL FSAR provides a summary of plant-specific PRA and its results. In addition, in FSAR Appendix 19AA, the applicant provides the following:

- EF3 SUP 19.5-2

In FSAR Appendix 19AA, the applicant summarized the results of its evaluation of site-specific and plant-specific information with respect to pertinent assumptions made in the certified design PRA. In addition, the applicant provides a summary of the Supplemental Information EF3 SUP 19.5-1 in Appendix 19AA.

In Section 19AA.2 of the application, the applicant discussed the following Fermi site-specific PRA attributes that were compared to ESBWR PRA.

The parameters and features discussed by the applicant included the following:

- loss of preferred power (LOPP) frequency
- loss of service water frequency
- site-specific terrain and meteorological data
- seismic fragilities
- plant-specific flooding zones of the yard and service water building

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

19AA.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is in NUREG–1966. In addition, the regulatory basis for requiring the supplementary information on consideration of site-specific and plant-specific information and design features is established in 10 CFR 52.79(a)(46) and in 10 CFR 52.79(d)(1), which requires (1) COL applicants referencing a certified design to include, in the FSAR, information sufficient to demonstrate that the site characteristics fall within the site parameters specified in the DC, and (2) plant-specific PRA information in a COL application that references a standard DC must use the PRA information from the DC and must be updated to account for site-specific design information and any design changes or departures. Consistent with 10 CFR 50.71(h), each COL holder shall maintain and upgrade the PRA. The upgraded PRA must cover initiating events and modes of operation contained in NRC-endorsed consensus standards on PRA in effect one year before each required upgrade.

19AA.4 Technical Evaluation

As documented in NUREG–1966, the NRC staff reviewed and approved Chapter 19 of the certified ESBWR DCD. The staff reviewed Appendix 19AA of the Fermi 3 COL FSAR, Revision 7, and checked the referenced DCD to ensure that the combination of the information in the COL FSAR and the information in the ESBWR DCD represents the complete scope of information relating to this review topic.[1] The staff's review confirmed that information in the application and the information incorporated by reference address the required information related to this section.

The staff reviewed the following information in the COL FSAR:

Supplemental Information

- EF3 SUP 19.5-2

The staff evaluated the following parameters and features:

- loss of preferred power (LOPP) frequency
- loss of service water frequency
- site-specific terrain and meteorological data
- seismic fragilities
- plant-specific flooding zones of the yard and service water building

Each of these parameters and features are evaluated below.

Loss of Preferred Power Frequency

In the response to RAI 19-1 dated December 21, 2009 (ADAMS Accession No. ML090140336), the applicant stated that it had compared LOPP frequencies for Fermi 2 with the values assumed in the certified design PRA and found the Fermi 2 values to be slightly lower. The staff finds this to be an adequate basis for concluding that ESBWR assumptions bound the expected plant-specific performance for the following reason: Fermi 2 and Fermi 3 are located

[1] See "*Finality of Referenced NRC Approvals*" in SER Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

on the same site and, therefore, they can be expected to have similar frequencies for the LOPP caused by weather conditions.

Loss of Service Water Frequency

The applicant stated that the ESBWR loss of service water frequency is based on NUREG/CR-5750, "Rates of Initiating Events at U.S. Nuclear Power Plants: 1987–1995." To justify the assertion that this approach is bounding, the applicant provided a detailed description of the features included in the Fermi 3 service water system (SWS) design to improve reliability over that of designs used in operating boiling-water reactors. The applicant also identified features that reduce the reliance of the system on raw water from Lake Erie. Some of these features include the following:

(1) The use of redundant components, automatic valves, and piping cross connects so that neither a single active nor single passive failure results in a complete loss of plant component cooling and/or plant dependence on any safety-related system.

(2) Capability for remote operation from the control room.

(3) The use of treated water from a closed-cycle system so that the system is not susceptible to failure mechanisms associated with the use of raw water.

(4) The use of diverse and redundant heat sinks (the natural draft cooling tower is normal heat sink and the mechanical draft cooling tower is backup heat sink).

(5) Self-cleaning strainers in the pumps that operate automatically.

Based on the above information, the staff finds that there is a reasonable basis to expect that the Fermi 3 SWS will be at least as reliable as the one modeled in the certified design PRA. Therefore, the loss of the service water frequency assumed in the ESBWR PRA will bound the Fermi 3 plant-specific value.

Site-Specific Terrain and Meteorological Data

Based on its review of information in the PRA report referenced in the ESBWR DCD, Tier 2, Revision 10, the staff found that the assumptions for tornado and hurricane frequencies in the certified design PRA are bounding for the Fermi 3 site. The tornado frequencies assumed in the certified design PRA were generated using data from the central region of the United States, where tornado intensities and frequencies of occurrence are the highest. These frequencies appropriately bound the Fermi 3 site, because the site is located in Michigan on the shore of Lake Erie. The hurricane frequencies were developed using data from a set of plants operating on the Atlantic coast in the southeastern United States. The frequencies assumed in the certified PRA were 5 times larger than the value derived from the coastal data. Because Fermi 3 is not located along the Atlantic coast, the Fermi 3 hurricane frequencies are well below those assumed in the certified design PRA.

Seismic Fragilities

The applicant provided an update of the ESBWR PRA-based seismic margin assessment and determined that the site- and plant-specific design parameters are bounded by the certified

design PRA. In FSAR Chapter 2, the applicant demonstrated that the site ground motion response spectra and foundation input response spectra are fully enveloped by the ESBWR CSDRS and established that the site geotechnical profiles are characterized as the hard rock site and that the site characteristics are bounded by the ESBWR site parameters. The applicant identified a commitment (COM 19.2-001) to confirm the as-built SSC HCLPF capacities as part of addressing DCD COL Item 19.2.6-1-A. The staff determined that the seismic margin assessment update provided by the applicant is consistent with the guidance in DC/COL-ISG-020, "Implementation of a Probabilistic Risk Assessment-Based Seismic Margin Analysis for New Reactors," and is therefore acceptable.

Internal Flooding

Internal Flooding Associated with Yard Area

In Appendix AA to Chapter 19 of the FSAR, the applicant discussed the extent to which the ESBWR PRA bounds the effects of site-specific internal and external flooding. The applicant stated that the yard flood zone includes essentially all outside areas of the site, and the plant grade level is above the ESBWR design flood level. The applicant added that the only components located in the yard that support a safety function are the manual fire hose connections to the reactor building and the fuel building. These connections are also above the design flood level. These connections provide the capability to connect another source of water to the isolation condenser/passive containment cooling system pools and the spent fuel pool after 7 days following a postulated accident. The certified design PRA did not credit use of these connections; therefore, consideration of site-specific external flooding would have no impact on the PRA results and conclusions. The staff reviewed the plant-specific flood zones of the yard described in the FSAR and the treatment of manual fire hose connections in the certified design PRA. Based on this review, the staff considers the certified design PRA results incorporated by reference to be bounding because the PRA has not credited the components that could be affected by external flooding.

Internal Flooding Associated with Service Water Structure

The applicant also discussed the extent to which the site-specific SWS could affect the results of the internal flooding risk assessment incorporated into the FSAR by reference. The Fermi 3 service water structure houses the four service water pumps and their associated power supplies and controls. The applicant stated that the certified design PRA model conservatively considers the service water structure to be one flood zone. Therefore, all four pumps are assumed to fail in an internal flood. In addition, the certified design PRA model does not credit operator actions to mitigate a flooding event, so differences in building location are not significant. Based on the applicant's information, the staff considers the treatment of the SWS in the certified design PRA to be bounding for Fermi 3 because the service water structure is treated as one flood zone. Under this assumption, a flood in that zone would result in a complete failure of the SWS.

The staff finds the information in Appendix 19AA to Chapter 19 of the FSAR is sufficient to support the conclusion that differences between site-specific parameters and features and assumptions in the DCD are small and do not invalidate the applicant's reference of the certified design PRA results and insights provided in Chapter 19 of the ESBWR DCD. Based on above discussion, the staff's review concludes that the applicant's information addressing Supplemental Information EF3 SUP 19.5-1, and EF3 SUP 19.5-2, as provided in Section 19.5 and Appendix 19AA of the Fermi COL FSAR, meets the relevant guidelines in Chapter 19 of

NUREG-0800, and is therefore acceptable. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the PRA Results and Insights have been resolved.

19AA.5 Post-Combined License Activities

The applicant has identified the following commitment:

- Commitment (COM 19.2-001) – Seismic High Confidence Low Probability Failure Margins As-built SSC High Confidence Low Probability of Failures (HCLPFs) will be compared to those assumed in the ESBWR seismic margin analysis shown in DCD Table 19.2-4. Deviations from the HCLPF values or other assumptions in the seismic margins evaluation will be analyzed to determine if any new vulnerabilities have been introduced. This comparison and analysis will be completed prior to fuel load.

19AA.6 Conclusion

The NRC staff's findings related to information incorporated by reference are in NUREG–1966. The NRC staff reviewed the application and checked the referenced DCD. The staff's review confirms finds that the applicant has addressed the required information relating to the PRA and that there is no outstanding information expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a)(5) and 10 CFR Part 52, Appendix E, Section VI.B.1, all nuclear safety issues relating to the summary of plant-specific PRA review that were incorporated by reference have been resolved.

The staff also compared the supplemental COL information within the application to the relevant NRC regulations. The regulatory basis for acceptance of the supplementary information on consideration of site-specific and plant-specific information and design features is established in 10 CFR 52.79(d)(1). The staff finds the applicant's consideration of site-specific and plant-specific information and design features sufficient to support the conclusion that differences between the site-specific parameters and features and the assumptions in the DCD are small and do not invalidate the applicant's reference to the DCD PRA results and insights provided in Chapter 19 of the ESBWR DCD.

In addition, the staff's review finds that the applicant's information addressing Supplemental Information EF3 SUP 19.5-1, and EF3 SUP 19.5-2 meets the relevant guidelines in Chapter 19 of NUREG-0800, and other NRC regulations, and is therefore acceptable.

ATTACHMENT 19.A

LOSS OF LARGE AREAS OF THE PLANT DUE TO EXPLOSIONS OR FIRES

19.A.1 Introduction

In a letter to the U.S. Nuclear Regulatory Commission (NRC), dated July 12, 2011 (Agencywide Documents Access and Management Systems (ADAMS) Accession No. ML11196A011), (not publicly available), Detroit Edison Company submitted Revision 3 of the Loss of Large Areas of the Plant due to Explosions or Fires "Mitigative Strategies Description and Plans" report for Fermi 3.

In the submittal, the applicant described how it will meet the requirements to address loss of large areas (LOLAs) of the plant due to explosions or fires from a beyond-design-basis event (BDBE). Title 10 of the *Code of Federal Regulations* (10 CFR) 52.80(d) and 10 CFR 50.54(hh)(2) detail these requirements. The attachment to this safety evaluation (SE) section, (Attachment 19.B "Loss of Large Areas of the Plant due to Explosions or Fire," (not publicly available)), as well as some documents referenced in this SE section, include security-related or safeguards information and are not publicly available.

The provisions of 10 CFR 52.80(d) require an applicant for a combined license (COL) to submit a description and plans for implementation of the guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities under the circumstances associated with LOLAs of the plant due to explosions or fire as required by 10 CFR 50.54(hh)(2).

The provisions of 10 CFR 50.54(hh)(2) require licensees to develop and implement guidance and strategies for addressing LOLAs of the plant due to explosions or fires from a BDBE. Specifically, the guidance and strategies are intended to maintain or restore core cooling, containment, and SFP cooling capabilities and include the following:

- firefighting
- operations to mitigate fuel damage
- actions to minimize radiological release

19.A.2 Summary of Application

In a letter dated July 12, 2011 (ADAMS Accession No. ML11196A011) (not publically available), the applicant submitted its "Mitigative Strategies Description and Plans." The applicant has incorporated this report, including applicable changes identified in response to the NRC requests for additional information (RAIs), into Revision 6 of Fermi 3 COL application. The applicant stated that it would implement the LOLA mitigative strategies, including implementation of operational and programmatic aspects of responding to LOLA events, before initial fuel load.

19.A.3 Regulatory Basis

NRC regulations in 10 CFR Parts 50 "Domestic Licensing of Production and Utilization Facilities," and in 10 CFR Part 52 provide the regulatory basis for the staff's review of the information in the Fermi 3 COL application. The applicable regulatory requirements for the LOLAs of the plant due to explosions or fires are as follows:

- 10 CFR 50.54(hh)(2)
- 10 CFR 52.80(d)

The applicable regulatory guidance includes Interim Staff Guidance (ISG) DC/COL-ISG-016, "Compliance with 10 CFR 50.54(hh)(2) and 10 CFR 52.80(d)," dated April 20, 2010 (ADAMS Accession No. ML101030529) (not publically available), which provides an acceptable means of meeting the requirements of 10 CFR 50.54(hh)(2) and 10 CFR 52.80(d). DC/COL-ISG-016 references the February 25, 2005, guidance letter (not publically available) to operating reactor licensees for Phase 1 and the Nuclear Energy Institute (NEI) document NEI 06-12, "B.5.b Phase 2 & 3 Submittal Guideline," Revision 3 dated September 2009, (ADAMS Accession No. ML092890400) (not publically available) for Phases 2 and 3.

DC/COL-ISG-016 takes exception to a few areas in NEI 06-12 and provides additional clarification and enhancement of NEI 06-12 and the staff's guidance letter dated February 25, 2005, based on NRC inspections of operating reactor implementation. DC/COL-ISG-016 has two attachments: Attachment 1, "Supplementary Guidance for Implementing Mitigation Strategies"; and Attachment 2, "Experience Gained from Implementation of Temporary Instruction 2515/171 at Currently Licensed Power Reactor Sites and Related Staff Positions."

19.A.4 Technical Evaluation

The staff reviewed the applicant's submittal consistent with the requirements of 10 CFR 52.80(d) and 10 CFR 50.54(hh)(2). The staff also used the guidance in DC/COL-ISG-016 to perform its review. DC/COL-ISG-016 references the February 25, 2005, guidance letter for Phase 1 and NEI 06-12 for Phases 2 and 3. Attachment 19.B (not publically available), discusses the staff's technical evaluation of the Fermi 3 LOLA Plan submittal.

The Fermi COL applicant provided the LOLA event evaluation via a three-phase approach similar to that for existing plants and consistent with Phases 1, 2, and 3 in the NEI 06-12 guidance. The applicant prepared its "Mitigative Strategies Description and Plans" report, dated December 21, 2009, at the programmatic level for licensing approval; the implementation details and documentation will be made available for inspection by the NRC before the initial fuel loading. In response to the NRC staff's RAIs 19.03-36 and 19.03-37, the applicant submitted additional information to clarify the "Mitigative Strategies Description and Plans" report. The NRC staff evaluated the applicant's responses to these RAIs in Attachment 19.B of this SE section.

In its submittal of the "Mitigative Strategies Description and Plans" report, the applicant provided a mitigative strategies table (MST) that follows the template guidance in Appendix D to NEI 06-12. The MST addresses various areas and issues pertinent to LOLAs and describes commitments for areas that are best resolved closer to the completion of the construction of

Fermi 3. All commitments made in the submittal will be implemented before the initial fuel loading of the unit.

The MST addresses the three phases considered in NEI 06-12:

- Phase 1—firefighting response strategy
- Phase 2—SFP cooling
- Phase 3—reactor core cooling and fission product release mitigation

Phases 1, 2, and 3 of NEI 06-12 are similar to the three areas included as part of the requirements in 10 CFR 50.54(hh)(2): firefighting, operations to mitigate fuel damage, and actions to minimize radiological releases. However, the three phases are categorized differently. In 10 CFR 50.54(hh)(2), the category of operations to mitigate fuel damage includes both the reactor core and the SFP, and the category of actions to minimize radiological release is separate. In NEI 06-12, separate phases address the SFP and reactor core cooling and the reactor core cooling and fission product release mitigation are combined. Despite the differences between the categorization of the phases in NEI 06-12 and the areas of the regulatory requirements, the staff finds that the applicant's submittal has included all of the necessary information.

The guidance for Phases 1, 2, and 3 suggests the development of certain strategies or processes to mitigate the consequences of a LOLA event. The applicant addressed all of these suggested strategies or processes. In evaluating each plant-specific mitigating strategy against its functional objective,[2] the staff weighed whether the strategy reasonably can be expected to successfully provide SFP cooling or to maintain or restore the key safety functions necessary to protect the reactor core and the containment. The staff's review considered the expected effectiveness of these strategies and the ease and timeliness of their implementation.

Although some strategies needed to meet the 10 CFR 50.54(hh)(2) requirements can be developed and implemented in the near future, some strategies and planning efforts cannot be effectively determined or implemented until the plant is further along in construction. To identify such commitments for future actions, the applicant documented areas that would be more appropriately completed before the initial fuel loading.

In a letter dated August 16, 2011 (ADAMS Accession No. ML11229A767), the applicant has identified the following commitment and License Condition to meet the requirements of 10 CFR 50.54(hh)(2) and 10 CFR 52.80.

- Commitment (COM 13.4-033) Mitigative Strategies Description and Plans – Prior to fuel load authorization per 10 CFR 52.103(g). [COM13.4-033]

License Condition 19A-1 - Operational Program Readiness

The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR

[2] As used here, the functional objective is the basic description of the capabilities of the conceptual strategy(s) as proposed for Phase 2 and 3 by NEI and accepted by the NRC.

Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first. This schedule shall also address:

a. The implementation of site specific Severe Accident Management Guidance.
b. The spent fuel rack coupon monitoring program implementation.

The staff reviewed the commitment and the license condition made by the applicant in its submittal and confirmed that "Mitigative Strategies Description and Plans" is listed in operational programs in FSAR Table 13.4-201. The staff is satisfied that the timing of all procedural or strategy development was appropriately scheduled before the initial fuel load.

The NRC staff reviewed the "Mitigative Strategies Description and Plans" report for content using DC/COL-ISG-016. The staff's review finds that the report includes all strategies considered essential for such a program and is therefore acceptable. The staff finds that the regulatory requirements of 10 CFR 52.80(d) are met, and there is reasonable assurance that the requirements in 10 CFR 50.54(hh)(2) will be met before the initial fuel loading of Fermi 3.

19.A.5 Post-Combined License Activities

The applicant has identified the following commitment and License Condition to meet the requirements of 10 CFR 50.54(hh)(2) and 10 CFR 52.80.

- Commitment (COM 13.4-033) – Develop Mitigative Strategies Description and Plans – Prior to fuel load authorization per 10 CFR 52.103(g).

License Condition – Operational Program Readiness (License Condition)

The licensee shall submit to the appropriate Director of the NRO, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first. This schedule shall also address:

a. The implementation of site specific Severe Accident Management Guidance.
b. The spent fuel rack coupon monitoring program implementation.

19.A.6 Conclusion

The NRC staff reviewed the information provided by the applicant under 10 CFR 52.80(d). The staff concludes that the applicant has adequately followed the guidance of DC/COL-ISG-016, NEI 06-12, and the February 25, 2005, guidance letter. The staff finds that the applicant provided sufficient information at the COL application stage, including commitments made in the Fermi 3 COL application, to meet the requirements of 10 CFR 52.80(d) and to provide reasonable assurance that the requirements in 10 CFR 50.54(hh)(2) will be met before the initial fuel loading of Fermi 3.

20.0 REQUIREMENTS RESULTING FROM FUKUSHIMA NEAR-TERM TASK FORCE RECOMMENDATIONS

This chapter addresses the Fukushima Near-Term Task Force (NTTF) recommendations that are applicable to the Fermi 3 Combined License (COL). The applicable recommendations address four topics: a reevaluation of the seismic hazard (related to Recommendation 2.1), mitigation strategies for beyond-design-basis external events (related to Recommendation 4.2), spent fuel pool (SFP) instrumentation (related to Recommendation 7.1), and emergency preparedness (EP) staffing and communications (related to Recommendation 9.3).

Background

In response to the events at Fukushima resulting from the March 11, 2011, Great Tohoku earthquake and tsunami in Japan, the U.S. Nuclear Regulatory Commission (NRC) established the NTTF to conduct a systematic and methodical review of NRC processes and regulations (1) to determine whether the agency should make additional improvements to its regulatory system; and (2) to make recommendations to the Commission for policy directions. In July 2011, the NTTF issued a 90-day report, SECY-11-0093 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML11186A950), "Near Term Report and Recommendations for Agency Actions Following the Events in Japan," identifying 12 recommendations. On September 9, 2011, in SECY-11-0124, "Recommended Actions to Be Taken without Delay from the NTTF Report," (ADAMS Accession No. ML11245A144) the staff submitted to the Commission for its consideration NTTF recommendations that can and—in the staff's judgment—should be partially or entirely initiated without delay. In SECY-11-0124, the staff identified and concluded that specific actions to address a subset of the NTTF recommendations would provide the greatest potential for improving safety in the near term:

1. Recommendation 2.1: Seismic and Flood Hazard Reevaluations

2. Recommendation 2.3: Seismic and Flood Walkdowns

3. Recommendation 4.1: Station Blackout Regulatory Actions

4. Recommendation 4.2: Equipment Covered under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.54(hh)(2)

5. Recommendation 5.1: Reliable Hardened Vents for Mark I Containments

6. Recommendation 8: Strengthening and Integration of Emergency Operating Procedures, Severe Accidents Management Guidelines, and Extensive Damage Mitigation Guidelines

7. Recommendation 9.3: Emergency Preparedness Regulatory Actions (staffing and communications).

On October 3, 2011, in SECY-11-0137, "Prioritization of Recommended Actions to Be Taken in Response to Fukushima Lessons Learned," (ADAMS Accession No. ML11272A203), the staff identified two actions in addition to the actions discussed in SECY-11-0124 that had the greatest potential for improving safety in the near term. The additional actions are as follows:

- Inclusion of Mark II containments in the staff's recommendation for reliable hardened vents associated with NTTF Recommendation 5.1.

- The implementation of SFP instrumentation proposed in Recommendation 7.1.

The staff also proposed to the Commission three tiers of prioritization for the NTTF recommendations. The first tier consists of those NTTF recommendations which the staff determined should be started without unnecessary delay and for which sufficient resource flexibility, including availability of critical skill sets, exists. The second tier consists of those NTTF recommendations which could not be initiated in the near term due to factors that include the need for further technical assessment and alignment, dependence on Tier 1 issues, or availability of critical skill sets. These actions do not require long-term study and can be initiated when sufficient technical information and applicable resources become available. The third tier consists of those NTTF recommendations that require further staff study to support a regulatory action, have an associated shorter-term action that needs to be completed to inform the longer-term action, are dependent on the availability of critical skill sets, or are dependent on the resolution of NTTF Recommendation 1.

On February 17, 2012, in SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami" (ADAMS Accession No. ML12039A103), the staff provided the Commission with proposed orders and requests for information to be issued to all power reactor licensees and holders of construction permits.

On March 9, 2012, the Commission approved issuing the proposed orders with some modifications in the staff requirements memorandum (SRM) to SECY-12-0025. As set forth in SRM-SECY-12-0025, the proposed orders are needed for continued adequate protection or to provide a substantial increase in the protection of public health and safety. In accordance with its statutory authority under Section 161 of the Atomic Energy Act of 1954, as amended (the Act), the Commission may impose these requirements.

On March 12, 2012, the NRC issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events"; and Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," to the appropriate licensees and permit holders, including the only holder at that time of a COL issued under 10 CFR Part 52, Southern Nuclear Operating Company, the licensee and operator of the Vogtle Electric Generating Plant Units 3 and 4 (ADAMS Accession Nos. ML12054A679 and ML12054A735). The staff also issued the requests for information pursuant to 10 CFR 50.54(f) regarding Recommendations 2.1, 2.3, and 9.3 to the appropriate licensees and construction permit holders in letters dated March 12, 2012 (ADAMS Accession No. ML12053A340).

The following Tier 1 recommendations from SECY-11-0137 as modified in SECY-12-0025 were considered in determining those that are applicable to the Fermi 3 COL review:

1. Recommendation 2.1: Seismic and Flood Hazard Reevaluations

2. Recommendation 2.3: Seismic and Flood Walkdowns

3. Recommendation 4.1: Station Blackout Regulatory Actions

4. Recommendation 4.2: Equipment Covered under 10 CFR 50.54(hh)(2)

5. Recommendation 5.1: Reliable Hardened Vents for Mark I and Mark II Containments

6. Recommendation 7.1: Spent Fuel Pool Instrumentation

7. Recommendation 8: Strengthening and Integration of Emergency Operating Procedures, Severe Accidents Management Guidelines, and Extensive Damage Mitigation Guidelines

8. Recommendation 9.3: Emergency Preparedness Regulatory Actions (staffing and communications)

The staff determined that the following four recommendations are applicable and should be addressed by the Fermi 3 COL applicant:

1. Recommendation 2.1: Seismic reevaluations - Order licensees to reevaluate the seismic hazards at their sites against current NRC requirements and guidance and, if necessary, update the design basis and structures, systems, and components (SSCs) important to safety to protect against the updated hazards.

2. Recommendation 4.2: Equipment covered under 10 CFR 50.54(hh)(2) - Order licensees to provide reasonable protection for equipment currently provided pursuant to 10 CFR 50.54(hh)(2) from the effects of design-basis external events, and to add equipment as needed to address multiunit events while other requirements are being revised and implemented.

3. Recommendation 7.1: Spent fuel pool instrumentation - Order licensees to provide sufficient safety-related instrumentation, able to withstand design-basis natural phenomena, and to monitor SFP parameters (i.e., water level, temperature, and area radiation levels) from the control room.

4. Recommendation 9.3: Emergency preparedness regulatory actions (staffing and communications) - Order licensees to do the following until rulemaking is complete:

    - Determine and implement the required staff to fill all necessary positions for responding to a multi-unit event.

    - Provide a means to power communications equipment needed to communicate onsite (e.g., radios for response teams and between facilities) and offsite (e.g., cellular telephones and satellite telephones) during a prolonged station blackout.

The staff determined that the remaining Tier 1 recommendations did not need to be considered further in the Fermi 3 COL review. The applicant evaluated the flood hazard using current guidance and methodologies. The staff thus determined that the applicant has already addressed the flood hazard reevaluation portion of Recommendation 2.1. Therefore, there

are no additional requirements left to address in Recommendation 2.1 for flooding reevaluations applicable to the Fermi 3 COL application. Additionally, the staff determined that Recommendation 2.3 was not applicable to the Fermi 3 COL because the plant is not yet constructed. The staff also determined that Recommendation 5.1 is not applicable because it applies to boiling-water reactor plant designs with Mark I and Mark II containments.

Recommendations 4.1 and 8 did not need to be considered further because SECY-11-0137 and the associated SRM direct that regulatory actions associated with these recommendations should be initiated through rulemaking.

In SECY-12-0025, the staff stated that all COL applicants would be asked to provide the information addressed in the orders and the requests for information through the review process. Accordingly, for the Fermi 3 COL application, the staff issued several requests for additional information (RAIs) related to the implementation of Fukushima NTTF recommendations pertaining to seismic hazard reevaluations; mitigation strategies for beyond-design-basis external events; SFP instrumentation; and EP staffing and communications based on Recommendations 2.1, 4.2, 7.1, and 9.3, as modified by SRM-SECY-12-0025. The following sections of this chapter present the staff's safety evaluation related to these areas.

20.1 Recommendation 2.1, Seismic Hazard Reevaluation

20.1.1 Introduction

SECY-12-0025, Enclosure 7, Attachment 1 to Seismic Enclosure 1 (ADAMS Accession No. ML12039A188) related to seismic hazard reevaluations specifies the use of NUREG–2115, "Central and Eastern United States Seismic Source Characterization for Nuclear Facilities," in a site probabilistic seismic hazard analysis (PSHA) and describes an updated cumulative absolute velocity (CAV) filter methodology. The staff issued NUREG–2115 in January 2012 as a replacement for the Electric Power Research Institute-Seismic Owners Group (EPRI-SOG) (EPRI 1986, 1989) and the Lawrence Livermore National Laboratory (LLNL) (Bernreuter et al., 1989) seismic source models for the central and eastern United States (CEUS). NUREG–2115 describes the implementation of a Senior Seismic Hazard Analysis Committee (SSHAC) Level 3 assessment process for developing the new regional seismic source characterization model for the CEUS (CEUS-SSC). Consistent with SECY-12-0025, as well as the need to consider the latest available information in the PSHA for the site, the staff requested the applicant to evaluate the seismic hazards at the Fermi 3 site against current NRC requirements and guidance.

20.1.2 Summary of Application

The applicant provided information to evaluate the seismic hazard at its site against current NRC requirements and guidance. Safety Evaluation Report (SER) Section 2.5.2, "Vibratory Ground Motion," and SER Section 3.7.1, "Seismic Design," provide detailed summaries of the Fermi 3 application related to the seismic hazard evaluation and calculation of the uniform hazard response spectra (UHRS); ground motion response spectra (GMRS); foundation input response spectra (FIRS); and performance-based surface response spectra (PBSRS). This section briefly summarizes the information.

On January 31, 2012, the NRC, U.S. Department of Energy (DOE), and EPRI issued a new seismic source characterization model and report for use in seismic hazard assessments for nuclear facilities in the CEUS. This cooperative project replaces seismic source models

developed in the 1980s by the EPRI-SOG (EPRI 1986, 1989) and the LLNL (Bernreuter et al., 1989). The applicant used the CEUS-SSC model for the seismic hazard reevaluation in the response to RAI 01.05-1 (ADAMS Accession No. ML12137A770). SER Section 2.5.2 describes this model in detail. RAI 01.05-1 requested the applicant to evaluate the seismic hazard at its site against current NRC requirements and guidance—as described in SECY-12-0025, Enclosure 7, Attachment 1 to Seismic Enclosure 1 (ADAMS Accession No. ML012039A188)—and to modify the site-specific GMRS and FIRS if changes are necessary given the evaluation. The applicant responded to RAI 01.05-1 in a letter dated January 25, 2013 (ADAMS Accession No. ML13032A378), which includes the following items:

1. Results of demonstration calculations showing the adequate implementation of the CEUS-SSC model using the Fermi 3 project PSHA software.

2. Seismic hazard results for reference CEUS hard rock conditions using the CEUS-SSC model.

3. Updated site amplification functions for a revised GMRS location based on the deaggregation of the seismic hazard derived using the CEUS-SSC model.

4. Seismic hazard results at the GMRS elevation calculated using the CEUS-SSC model with a fixed lower bound magnitude of M5 instead of the CAV filter.

5. An updated GMRS based on the CEUS-SSC model.

The applicant subsequently incorporated Items 2 through 5 into Fermi 3 COL FSAR, Section 2.5.2 in a letter dated March 15, 2013 (ADAMS Accession No. ML13079A490). In addition, the applicant submitted the updated FIRS and PBSRS as proposed revisions to Fermi 3 COL FSAR, Section 3.7.1 in a letter dated April 26, 2013 (ADAMS Accession No. ML13150A223).

20.1.3 Regulatory Basis

The applicable regulatory requirements for the seismic hazard reevaluation are established and described in Subsections 2.5.2.3 and 3.7.1.3 of this SER. The applicable regulatory requirements are as follows:

- 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” Appendix A, “General Design Criteria for Nuclear Power Plants,” General Design Criterion (GDC) 2, “Design basis for protection against natural phenomena.”

- 10 CFR Part 50, Appendix S, “Earthquake Engineering Criteria for Nuclear Power Plants.”

- Processes for changes and departures in 10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”

- 10 CFR 52.79(a)(1)(iii), as it relates to considerations of the most severe natural phenomena historically reported for the site and the surrounding area.

- 10 CFR 100.23, “Geologic and Seismic Siting Criteria.”

In addition, the seismic hazards reevaluation should be consistent with the following applicable guidance:

- NUREG–0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition),” the Standard Review Plan (SRP).

- Regulatory Guide (RG) 1.60, Revision 1, "Design Response Spectra for Seismic Design of Nuclear Power Plants.”

- RG 1.132, Revision 2, "Site Investigations for Foundations of Nuclear Power Plants.”

- RG 1.206; “Combined License Applications for Nuclear Power Plants (LWR Edition).”

- RG 1.208; “A Performance-Based Approach to Define Site-Specific Earthquake Ground Motion.”

- Design Certification/COL-Interim Staff Guidance (DC/COL-ISG)-017, “Ensuring Hazard-Consistent Seismic Input for Site Response and Soil Structure Interaction Analyses.”

20.1.4 Technical Evaluation

SER Section 2.5.2 provides the staff’s evaluation of the applicant’s Fermi 3 site seismic hazard calculation using the CEUS-SSC model, which was performed in accordance with SECY-12-0025 and the updated UHRS and GMRS. SER Section 3.7.1 provides the staff’s evaluation of the updated FIRS and PBSRS. For the staff’s conclusions with respect to the adequacy of these analyses, see Sections 2.5.2 and 3.7.1 of this SER.

To address the guidance in SECY-12-0025, Enclosure 7, Attachment 1 to Seismic Enclosure 1, the applicant evaluated potential seismic hazards at the Fermi 3 site using the CEUS-SSC model (NUREG–2115) and applying the fixed lower bound magnitude of M5 as described in the SECY. Because the Fermi 3 rock hazard based on the CEUS-SSC model is generally higher than that obtained from the updated EPRI-SOG model in Revision 4 of the Fermi 3 FSAR, the applicant performed an update of the Fermi 3 site PSHA and GMRS based on the CEUS-SSC model. The applicant thus revised Fermi 3 FSAR Section 2.5.2 and submitted the proposed revisions in a letter dated March 15, 2013 (ADAMS Accession No. ML13079A490). The applicant also revised FSAR Section 3.7.1 and submitted the proposed revisions in a letter dated April 26, 2013 (ADAMS Accession No. ML13150A223). Based on the staff’s technical evaluation in SER Subsections 2.5.2.4 and 3.7.1.4, and the conclusions documented in those SER subsections, the staff concludes that the applicant has accurately calculated the Fermi site-specific UHRS, GMRS, FIRS, and PBSRS using the CEUS-SSC model recommended in SECY-12-0025, Enclosure 7, Attachment 1 to Seismic Enclosure 1. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as part of Confirmatory Item 20.1-1. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, Confirmatory Item 20.1-1 is closed.

20.1.5 Post Combined License Activities

There are no post COL activities related to this section.

20.1.6 Conclusion

NRC staff reviewed the information submitted by the applicant in response to SECY-12-0025 regarding Recommendation 2.1, the seismic hazard reevaluation. The staff confirms that the applicant has adequately addressed the necessary information and has evaluated the seismic hazards at the Fermi 3 site against the current NRC requirements and guidance in 10 CFR 100.23; 10 CFR 52.79 (a)(1)(iii); 10 CFR Part 50, Appendix A, GDC 2; 10 CFR Part 50, Appendix S; NUREG–0800, Sections 2.5.2, and 3.7.1; RG 1.60; RG 1.132; RG 1.206; RG 1.208; and DC/COL-ISG-017.

20.2 Recommendation 4.2, Mitigation Strategies for Beyond-Design-Basis External Events

20.2.1 Introduction

SECY-12-0025 states that the staff will request all COL applicants to provide the information addressed in the orders (EA-12-049, EA-12-050, and EA-12-051) through the review process. For mitigation strategies for beyond-design-basis external events, SECY-12-0025 outlines a three-phase approach. The initial phase involves the use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool cooling (SFPC) without alternating current power. The transition phase involves providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase involves obtaining sufficient offsite resources to sustain those functions indefinitely.

The Japan Lesson-Learned Project Directorate (JLD)-ISG-2012-01, Revision 0, “Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,” (ADAMS Accession No. ML12229A174) endorses with clarification the methodologies described in the industry guidance document Nuclear Energy Institute (NEI) 12–06, Revision 0, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,” (ADAMS Accession No. ML12242A378) and provides an acceptable approach for satisfying the applicable requirements.

Application of JLD-ISG-2012-01 to new reactors, such as Fermi 3, requires appropriate consideration of the approaches to nuclear safety inherent in the specific designs. The Fermi 3 nuclear power plant references the Economic Simplified Boiling-Water Reactor (ESBWR) standard design that utilizes passive design features that provide core cooling, containment, and SFPC capabilities for 72 hours without relying on alternating current (ac) power. The ESBWR design also includes additional installed ancillary equipment that could extend the time period from 72 hours to 7 days to maintain safety functions using available onsite resources.

20.2.2 Summary of Application

The applicant addresses mitigation strategies in Section 1.5.1.1.1, “Recommendation 4.2, Mitigating Strategies for Beyond-Design-Basis External Events” of the application. The NRC issued RAI Letter Number 78 (RAI 01.05-3 and RAI 01.05-4) dated July 3, 2012 (ADAMS Accession No. ML121850099); and RAI Letter Number 84 (RAI 01.05-5 and RAI 01.05-6) dated March 19, 2013 (ADAMS Accession No. ML13078A436). The NRC requested the applicant to address the three-phase approach for mitigating beyond-design-basis external events and the mitigating strategies for ensuring that core cooling, containment, and SFPC

capabilities function indefinitely. In letters responding to RAI Letter 84 dated April 18, 2013 (ADAMS Accession No. ML13109A426); July 9, 2013 (ADAMS Accession No. ML13192A301); and February 28, 2014 (ADAMS Accession No. ML14064A284), the applicant described the three-phase mitigation strategies for beyond-design-basis external events. The applicant responded to RAI Letter Number 78 in a letter dated August 24, 2012 (ADAMS Accession No. ML12240A184); and in subsequent supplemental response letters dated January 25, 2013 (ADAMS Accession No. ML13028A402); and February 19, 2013 (ADAMS Accession No. ML13051A657). In the response to the RAIs, the applicant proposed adding the following license condition related to mitigation strategies for beyond-design-basis external events:

> At least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR § 52.103(a), DTE Electric Company shall use the guidance contained in JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," Revision 0 and the information presented in Fermi FSAR Section 01.05 to complete the development of strategies and guidance for maintaining and, if necessary restoring core cooling, containment, and SFPC capabilities beginning 72 hours after loss of all normal and emergency ac power sources, including any alternate ac source under 10 CFR 50.63. These strategies must be capable of:
>
> - Mitigating a simultaneous loss of all ac power sources, both from the onsite and offsite power systems, and loss of normal access to normal heat sink,
>
> - Maintaining core cooling, containment, and SFPC capabilities for Fermi Unit 3 during and after such an event affecting both Fermi Unit 2 and 3, and
>
> - Being implemented in all plant modes.
>
> Before initial fuel load, DTE Electric Company shall fully implement the strategies and guidance required in this license condition, including procedures, training, and acquisition, staging or installation of equipment and consumables relied upon in the strategies.

The RAI response also included a proposed revision to the COL application Part 10, Section 3.8.2, "Mitigation Strategies for Beyond-Design-Basis External Events."

20.2.3 Regulatory Basis

The requirements and guidance for mitigation strategies for beyond-design-basis external events are established or described in the following:

- Atomic Energy Act of 1954, as amended (the Act), Section 161, authorizes the Commission to regulate the possession and utilization of special nuclear material in a manner that is protective of public health and in accordance with the common defense and security.

- 10 CFR 52.97(a)(1) which authorizes the Commission to issue a COL if it finds, among other things, that issuance of the license will not be inimical to the health and safety of the public. This regulation applies here because the Commission found in

Order EA-12-049 that it is necessary for power reactor licensees to develop, implement and maintain guidance and strategies to restore or maintain core cooling, containment, and SFP cooling capabilities in the event of a beyond-design-basis external event in order to ensure adequate protection of the public health and safety.

- SRM-SECY-12-0025, "Staff Requirements – SECY-12-0025 – Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," dated March 9, 2012, approves the issuance of orders for beyond-design-basis external events, as necessary, for ensuring the continued adequate protection under the 10 CFR 50.109(a)(4)(ii) exception to the Backfit Rule.

- Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012. Although Order EA-12-049 does not apply to Fermi 3, the staff has followed the current NRC and industry guidance for mitigation strategies in evaluating the equipment used as part of the FLEX mitigation strategy for Fermi 3.

- JLD-ISG-2012-01, Revision 0, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," issued August 29, 2012, endorses NEI 12–06, Revision 0, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" (issued August 21, 2012), with exceptions/clarifications.

20.2.4 Technical Evaluation

The NRC issued Order EA-12-049 on March 12, 2012, which required operating reactor licensees and construction permit holders to deploy strategies that will enhance their ability to cope with conditions resulting from beyond-design-basis external events. Attachment 2 to Order EA-12-049 specifies the use of a three-phase approach for mitigating these events. The initial phase involves the use of installed equipment and resources to maintain or restore core cooling, containment and SFPC capabilities. The transition phase involves providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase involves obtaining sufficient offsite resources to sustain those functions indefinitely. Application of the three-phase approach to new reactors, such as Fermi 3, requires appropriate consideration of the approaches to nuclear safety inherent in the specific designs.

In RAI 01.05-5, the staff requested the applicant to address how the initial and transition phase mitigation will be accomplished in the event of an extended loss of ac power (ELAP) event at Fermi 3. RAI 01.05-3 requested the applicant to address the final phase mitigation describing the strategies for maintaining and restoring core cooling, containment and SFPC capabilities with use of offsite resources. The staff also requested the applicant to address the ability to implement the strategies in all modes.

Initial and Transition Phase Mitigation – Core Cooling and Containment Function

In the response to RAI 01.05-5 dated April 18, 2013 (ADAMS Accession No. ML13109A426), the applicant provided information on the mitigating strategies that would be used to cope with an ELAP resulting from a beyond-design-basis external event. For this evaluation, the applicant assumed that the plant would be in a station blackout (SBO), which assumes a loss

of all offsite power sources with a concurrent loss of the onsite standby diesel generators. The applicant's response indicated that, for the ESBWR, the underlying strategies for coping with an extended loss of ac power events involve a three-phase approach; and that the passive safety features of the ESBWR and the installed ancillary equipment provide a significant coping period.

In regard to the initial phase mitigation, the applicant's response to RAI 1.05-5 states the following:

> Section 15.5.5 and Section 19A.2.2 of the ESBWR Design Control Document (DCD), which are incorporated by reference into the Fermi 3 FSAR, provide a performance evaluation for station blackout and show conformance to the requirements of 10 CFR 50.63 as it relates to maintaining core cooling, inventory control, and containment heat removal.
>
> The analysis in DCD Tier 2, Section 15.5.5 demonstrates that reactor water level is maintained above the top of the active fuel by operation of the ICS [isolation condenser system], a safety-related system. Because the ICS removes the reactor decay heat to the IC/PCCS [passive containment cooling system] pools that are outside the containment, the containment and suppression pool pressures and temperatures are maintained within the design limits. Therefore the integrity of the containment is maintained. As described in DCD, Section 15.2.2.9, during refueling mode, GDCS [gravity-driven cooling system] is available to ensure extended core cooling and inventory control for at least 72 hours.

The applicant indicated that the design basis for the ESBWR standard plant includes passive features that provide core, containment, and SFPC capabilities for 72 hours, with no reliance on ac power. Section 19A.2.2 of the ESBWR DCD states that "the ESBWR is designed such that no operator actions or AC power are required for a station blackout event, for 72 hours," and the ESBWR is designed to successfully mitigate an SBO event to meet the requirements of 10 CFR 50.63, "Loss of all alternating current," using safety-related SSCs. This 72-hour mitigation capability addresses the initial phase mitigation for ESBWR plants such as Fermi 3, and this mitigation capability provides adequate time to transition to final phase mitigation, without necessarily relying upon a transition phase. This is because the transition phase is defined as the time necessary for resources to be brought from offsite and 72 hours is a sufficiently long time period. Nevertheless, the ESBWR design includes installed ancillary equipment that could potentially extend the time period for transition from the initial phase mitigation to final phase mitigation to 7 days.

10 CFR 50.63(a)(2) includes a provision that is the premise for the acceptance of an SBO for core cooling and the containment function. The provision requires the following:

> The reactor core and associated coolant, control, and protection systems, including station batteries and any other necessary support systems, must provide sufficient capacity and capability to ensure that the core is cooled and appropriate containment integrity is maintained in the event of an SBO for the specified duration. The capability for coping with an SBO of specified duration shall be determined by an appropriate coping analysis.

ESBWR DCD, Tier 2, Section 15.5.5 contains the results of the DCD applicant's performance evaluation for an SBO showing conformance to the requirements of 10 CFR 50.63.

NRC staff reviewed ESBWR DCD, Tier 2, Section 15.5.5, as part of the ESBWR DCD review. In Subsection 15.5.5.4 of the ESBWR Final Safety Evaluation Report SER (FSER) in NUREG–1966, "Final Safety Evaluation Report Related to the Certification of the Economic Simplified Boiling-Water Reactor," the staff concluded that

> The ESBWR reactor core and associated coolant, control, and protection systems, including station batteries and other necessary support systems, provide sufficient capacity and capability to ensure that the core is cooled and appropriate containment integrity in the event of an SBO for 72 hours. The applicant conducted an appropriate coping analysis to demonstrate the capability for coping with an SBO with a 72-hour duration, and hence, the acceptance criteria are satisfied.

Fulfilling the requirements for an SBO, per 10 CFR 50.63, but without reliance on an alternate ac source, assures adequate core and containment cooling of the plant for operating modes ranging from normal power operation (Mode 1) to safe shutdown (Mode 4). Adequate cooling must also be provided when the plant is in cold shutdown (Mode 5) and refueling (Mode 6).

In Mode 5, when insufficient steam is available to drive the ICS, the GDCS can be used to perform the core cooling function. In Mode 6, the only core cooling systems available during the ELAP event are the GDCS and the suppression pool. In ESBWR FSER Section 16.2.8, the staff's discussion of RAI 16.2-37 states that General Electric-Hitachi performed an analysis to show that the water above the core will be sufficient to keep the core covered and to maintain an adequate level of shielding. Based on the results of this analysis, the staff concludes that in Mode 6 with the reactor cavity flooded up, a sufficient water inventory would exist for 72 hours to passively provide decay heat removal and to protect the fuel. DCD Tier 2, Subsection 19A.3.1.1 states that during shutdown conditions, either the GDCS or the flooded-up refueling volume is sufficient to ensure core cooling. Once activated, neither power nor controls are necessary to maintain these functions for 72 hours. The staff therefore concludes that the strategies adequately address that for an ELAP in Modes 5 and 6, core cooling, has been adequately addressed because sufficient water either from the GDCS pools and the suppression pool or from the flooded-up refueling volume will be available, and is sufficient to ensure core cooling for 72-hours.

For the transition phase, NRC order EA-12-049 allows use of portable, onsite equipment and consumables to maintain or restore core cooling, containment, and SFPC functions until they can be accomplished with resources brought from offsite (e.g., on Page 4 of the order). As discussed above, the initial phase mitigation of 72 hours provides sufficient time for resources to be brought from offsite. As such, reliance on a transition phase is not necessary for Fermi 3.

In the response to RAI 01.05-5 the applicant also discusses a coping strategy to extend the cooling capability beyond 72 hours and for up to 7 days. In particular, the applicant states that following the 72-hour passive system coping time, support is required to continue passive system cooling and makeup to the IC/PCCS pools and spent fuel storage pools. This support could be provided by installed plant ancillary equipment as discussed in ESBWR DCD Tier 2, Section 19A.3.1, "Actions Required Beyond 72 Hours." Section 19A.3.1 describes the post 72-hour actions and the use of installed regulatory treatment of non-safety systems (RTNSS) equipment for core, containment, and spent fuel cooling safety functions. NRC's evaluation of

the ESBWR RTNSS program is provided in Chapter 22, “Regulatory Treatment of Nonsafety Systems,” of the ESBWR FSER, and includes an evaluation of the augmented design standards for RTNSS equipment to withstand external events such as earthquakes, hurricanes, tornadoes, and floods.

Initial and Transition Phase Mitigation – Spent Fuel Pool Cooling

The applicant addressed mitigation strategies for SFPC in the response to the first question in RAI 01.05-5. That response addressed the initial phase mitigation with the following statement:

> As described in the ESBWR DCD, Section 9.1.3.2, which is incorporated by reference into the Fermi 3 FSAR, during a loss of spent fuel pool and buffer pool cooling, cooling of the spent fuel pool and buffer pool is accomplished by allowing the water in the pools to heat and boil. There is sufficient water in each pool to ensure adequate fuel cooling for 72 hours.

The applicant addressed the transition phase mitigation by stating the following:

> DCD Section 19A.3.1, which is incorporated by reference into the Fermi 3 FSAR, describes the post 72-hr actions and credits use of installed regulatory treatment of non-safety systems (RTNSS) equipment.
>
> After 72 hours, nonsafety-related systems are used to replenish the passive systems to perform these safety functions directly. As described in Section 9.1.3, and 19A.3.1, after 72 hours, makeup water can be provided through installed safety-related connection to the Fire Protection System (FPS) or spent fuel storage pool. Between 72 hours and seven days, the resources for performing theses safety functions are available onsite.

The staff reviewed the information regarding the ESBWR SFPC as part of the review of the ESBWR DCD, which is documented in Section 9.1.3 of the ESBWR DCD FSER. The staff concludes that for both the buffer pool and the SFP, the water levels and free volumes are sufficient to ensure that for 72 hours following a loss of forced cooling without active cooling water makeup, the water levels in the pools will remain above the top of active fuel (TAF) which provides sufficient time for initial phase mitigation and for resources to be bought from offsite.

Similar to that for the core cooling and containment functions discussed above, installed plant ancillary equipment could potentially extend this time period to 7 days.

Final Phase Mitigation

To support core cooling, containment, and spent fuel pool cooling post 72-hours, the ESBWR design has installed ancillary equipment with sufficient capacity. This equipment is designed to augmented design standards for external events, such as earthquakes, hurricanes, tornadoes, and floods, as documented in the ESBWR DCD Section 19A.3.1 and the NRC’s ESBWR FSER Section 22.5.6. The ancillary equipment is capable of delivering at least minimum water quantities, at the minimum makeup rates, needed to support heat removal from the core and spent fuel pool. In its response to RAI 01.05-5 the applicant describes the

use of this equipment to allow the extension of the initial mitigation phase from 72 hours up to 7 days.

In its response to RAI 01.05-5, the applicant indicated that the ESBWR has safety-related connections through which makeup water can be supplied. These connections allow portable equipment brought in from offsite to be used to support continued operation of the ESBWR passive systems, as an alternative to the plant installed ancillary equipment if it is not available or operable. These connections would be used during the final mitigation phase.

In the response to RAI 01.05-3 dated February 28, 2014 (ADAMS Accession No. ML14064A2847), the applicant addresses final phase mitigation by proposing a license condition related to mitigation strategies for beyond-design-basis external events. Confirmation that the proposed license condition is included in the next revision of the COL application, Part 10, Section 3.8.2, was being tracked as **Confirmatory Item 20.2-1**. The staff reviewed the applicant's proposed license condition and revised it to enhance consistency with current staff expectations related to these mitigation strategies as stated below in Section 20.2.5 of this SER. Therefore, Confirmatory Item 20.2-1 is closed.

20.2.5 Post Combined License Activities

The ESBWR design incorporated by reference into the Fermi COL includes passive design features that provide core cooling, containment, and SFPC for 72 hours without reliance on ac power. These features do not rely on access to any external water sources. The ESBWR design also includes onsite equipment to replenish water sources and charge batteries. Connections are provided for using generators and pumping equipment that can be brought from offsite.

For the reasons discussed in 20.2.4, Technical Evaluation, the staff will include the following license condition related to the mitigating strategies program:

> **License Condition (20.2-1)**: Mitigation Strategies for Beyond-Design-Basis External Events
>
> a. DTE Electric Company shall complete development of an overall integrated plan of strategies to mitigate a beyond-design-basis external event at least 1 year before the completion of the last ITAAC on the schedule required by 10 CFR 52.99(a).
>
> b. The overall integrated plan required by this condition must include guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities. The overall integrated plan must include provisions to ensure that all accident mitigation procedures and guidelines (including the guidance and strategies required by this section, emergency operating procedures, abnormal operating procedures, and extensive damage management guidelines) are coherent and comprehensive.
>
> c. The guidance and strategies required by this condition must be capable of (i) mitigating a simultaneous loss of all alternating current (ac) power and loss of normal access to the normal heat sink and (ii) providing for adequate capacity to perform the functions upon which the guidance and

strategies rely for all units on the Fermi site and in all modes at each unit on the site.

d. Before initial fuel load, DTE Electric Company shall fully implement the guidance and strategies required by this condition, including:

   1. Procedures;

   2. Training;

   3. Acquisition, staging, or installation of equipment and consumables relied upon in the strategies; and

   4. Configuration controls and provisions for maintenance and testing (including testing procedures and frequencies for preventative maintenance) of the equipment upon which the strategies and guidance required by this condition rely.

e. The training required by condition d.2 must use a Systematic Approach to Training (SAT) to evaluate training for station personnel, and must be based upon plant equipment and procedures upon which the guidance and strategies required by this section rely.

f. DTE Electric Company shall maintain the guidance and strategies described in the application upon issuance of the license, and the integrated plan of strategies upon its completion as required by condition a. DTE may change the strategies and guidelines required by this Condition provided that DTE evaluates each such change to ensure that the provisions of conditions b and c continue to be satisfied and DTE documents the evaluation in an auditable form.

20.2.6 Conclusion

The staff reviewed the applicant's proposed mitigating strategies discussed in Section 1.5.1.1.1 of the application for ensuring that core cooling, containment, and SFPC capabilities function indefinitely without ac power, in the event of a beyond-design-basis external event resulting in an extended loss of ac power. The staff also evaluated the applicant's mitigating strategies for the Fermi 3 ESBWR in the responses to RAI 01.05-3 and RAI 01.05-5. The staff finds that the approach for mitigating beyond-design-basis external events to be used at Fermi 3 is consistent with NRC Order EA-12-049. The staff also finds that the ESBWR passive design features provide for initial phase mitigation because core cooling, containment function and SFPC are achieved without ac power or operator action for the first 72 hours. In addition, through the implementation of the final phase mitigation using offsite FLEX equipment, core cooling, containment function and SFPC can be extended indefinitely.

20.3 Recommendation 7.1, Reliable Spent Fuel Pool Instrumentation

20.3.1 Introduction

During the events in Fukushima, responders were without reliable instrumentation to determine the water level in the SFP. This raised concerns that the pool may have boiled dry, resulting in fuel damage, which highlighted the need for reliable SFP instrumentation. The current SFP water level instrumentation at U.S. nuclear power plants is typically a narrow range and, therefore, it is only capable of monitoring normal and slightly off-normal conditions. Although the likelihood of a catastrophic event affecting nuclear power plants and the associated SFPs in the United States remains very low, beyond-design-basis external events could challenge the ability of existing SFP instrumentation to provide emergency responders with reliable information on the condition of the SFPs. Reliable and available indicators are essential to ensure that plant personnel can effectively prioritize emergency actions.

SECY-12-0025 (ADAMS Accession No. ML12039A103) states that for DC and COL applications submitted under 10 CFR Part 52 and in active staff review, the staff plans to assure that the Commission-approved Fukushima actions are addressed before certification or licensing. The staff will request all COL applicants to provide the information addressed in the orders (EA-12-049, EA-12-050, and EA-12-051) and the request for information letters described in this SECY paper, as applicable, through the review process.

JLD-ISG-2012-03, Revision 0, “Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation,” (ADAMS Accession No. ML12221A339) endorses with exceptions and clarifications the methodologies described in the industry guidance document NEI 12–02, Revision 1, “Industry Guidance for Compliance with NRC Order EA-12-051, To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,” (ADAMS Accession No. ML122400399) and provides an acceptable approach for satisfying the applicable requirements.

20.3.2 Summary of Application

The applicant addresses reliable spent fuel pool instrumentation in Section 1.5.1.1.2, “Recommendation 7.1, Reliable Spent Fuel Pool Instrumentation” of the application. The NRC issued RAI Letter Number 78 (RAI 01.05-4) dated July 3, 2012 (ADAMS Accession No. ML121850099), and RAI Letter 84 (RAI 01.05-6) dated March 19, 2013 (ADAMS Accession No. ML13078A436). In these RAI letters, the staff requested the applicant to address the provisions for monitoring key SFP parameters as described in Order EA-12-051 dated March 12, 2012 (ADAMS Accession No. ML12054A679), which are not part of the ESBWR DCD, and to include any proposals for changes to the current application. The applicant responded to these RAIs in letters dated August 24, 2012 (ADAMS Accession No. ML12240A184); January 25, February 19, April 18, July 9 and October 15, 2013 (ADAMS Accession Nos. ML13028A402, ML13051A057, ML13109A426, ML13192A301, and ML13311A101 respectively). As part of the RAI responses, the applicant described the SFP and the buffer pool level instrument design features that ensure a reliable indication of the water level in the SFP and buffer pools. The applicant proposed changes to FSAR Tier 2, Subsection 1.5.1.1.2, “Recommendation 7.1, Reliable Spent Fuel Pool Instrumentation”; and a license condition in Part 10, Revision 4, Section 3.8.3, “Reliable Spent Fuel Pool/Buffer Pool Level Instrumentation,” which verifies that the programmatic aspects of the order are completed and implemented prior to initial fuel loading.

20.3.3 Regulatory Basis

The requirements and guidance for reliable SFP instrumentation are established or described in the following:

- Atomic Energy Act of 1954, as amended, (the Act), Section 161, authorizes the Commission to regulate the possession and utilization of special nuclear material in a manner that is protective of public health and in accordance with common defense and security.

- 10 CFR 52.97(a)(1) which authorizes the Commission to issue a COL if it finds, among other things, that issuance of the license will not be inimical to the health and safety of the public. This regulation applies here because the Commission found in Order EA-12-049 that it is necessary for power reactor licensees to develop, implement and maintain guidance and strategies to restore or maintain core cooling, containment, and SFP cooling capabilities in the event of a beyond-design-basis external event in order to ensure adequate protection of the public health and safety.

- SRM-SECY-12-0025, "Staff Requirements – SECY-12-0025 – Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," dated March 9, 2012, approves the issuance of orders for reliable SFP instrumentation under an administrative exemption to the Backfit Rule.

- Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012.

- JLD-ISG-2012-03, Revision 0, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," issued August 29, 2012, endorses NEI 12–02, Revision 1, "Industry Guidance for Compliance with NRC Order EA-12-051, To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," with exceptions and clarifications.

20.3.4 Technical Evaluation

As a result of SECY-12-0025, the staff issued RAI Letter 78 (RAI 01.05-4) requesting additional information in relation to the lessons learned from the Great Tohoku Earthquake and Tsunami. In RAI 01.05-4, the staff requested the applicant to address the provisions for monitoring key SFP parameters as described in the order dated March 12, 2012, which are not part of the ESBWR design—including any proposals for changes to the current application.

In Commission Order EA-12-051, the NRC describes the key parameters used to determine that a level instrument is considered reliable. NEI 12–02, Revision 1 provides an acceptable approach for satisfying the applicable requirements. The staff evaluated the applicant's response to RAI 01.05-4 and determined that additional information was needed. The staff issued RAI 01.05-6 requesting the applicant to provide further clarification on the level instrument design criteria and programmatic aspects. In the applicant's responses, they suggested the creation of a new license condition in Section 3.8.3 to Part 10 of the COL application; and FSAR changes to Tier 2, Subsection 1.5.1.1.2 that provided further design information and discussed how the SFP level instrument is designed to be reliable according to the guidance in NEI 12–02. The applicant's response and the proposed FSAR changes

take credit for design information already described in several sections of the ESBWR DCD. The staff's evaluation of the DCD sections is discussed in the ESBWR DCD FSER (NUREG-1966) and is not part of this SER.

Instruments

In Commission Order EA-12-051, Attachment 2, Section 1.1 states that the SFP level instrument channels shall consist of a permanent and fixed primary instrument channel and a backup instrument channel. The backup instrument channel may be fixed or portable. Portable instruments shall have capabilities that enhance the ability of trained personnel to monitor the SFP water level under conditions which restrict direct personnel access to the pool, such as partial structural damage, high radiation levels, or heat and humidity from a boiling pool.

The applicant's response to RAI 01.05-6 (ADAMS Accession No. ML13192A301) proposed changes to FSAR Tier 2, Subsection 1.5.1.1.2, which references ESBWR DCD, Tier 2, Section 9.1.3 which states that the SFP and the buffer pool each have two wide-range, safety-related level transmitters that transmit signals to the main control room. These signals are used to indicate a collapsed water level and to initiate high/low-level alarms, both locally and in the main control room. ESBWR DCD, Tier 2, Subsection 7.5.5.3.1 indicates that the safety-related pool monitoring instrumentation design conforms to Institute for Electrical and Electronics Engineers (IEEE) Standard (Std) IEEE Std 603–1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations."

The staff noted that the ESBWR DCD credits the SFP pool level instruments as operational in environmental conditions consistent with boiling down to the top of the active fuel. These conditions would result in a high temperature (100 degrees Celsius [212 degrees Fahrenheit]), high humidity, steaming environment, loss of shielding, and high radiation doses. The staff evaluated the instrument description in the RAI response and the proposed changes to the FSAR. The staff determined that crediting two permanently installed, safety-related, seismic Category I instruments is in accordance with the design features identified in Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as Confirmatory Item 20.3-1. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

Arrangement

In Commission Order EA-12-051, Attachment 2, Section 1.2 states that the SFP level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP. This protection may be provided by locating the safety-related instruments to maintain instrument channel separation within the SFP area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the SFP structure.

The applicant's response to RAI 01.05-6 states that the SFP level instrument channels will be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP. The applicant's response refers to ESBWR DCD, Tier 2, Subsection 7.5.5.3.2, which indicates that the SFP and the buffer pool instrumentation meets the separation criteria set forth in 10 CFR Part 50,

Appendix A, GDC 24, “Separation of protection and control system.” Also, ESBWR DCD, Tier 2, Section 7.5.5 indicates that the safety-related pool monitoring instrumentation is designed to satisfy the requirements of IEEE Standard 603–1991, as endorsed by RG 1.153, Revision 1, “Criteria for Safety Systems,” which includes requirements for the physical separation of channels to avoid a common mode failure due to a missile. ESBWR DCD, Tier 2, Subsection 3.8.4.1.1 indicates that the reactor building, which houses the buffer pool, is a seismic Category I structure. ESBWR DCD, Tier 2, Subsection 3.8.4.1.3 describes the fuel building, which houses the SFP facilities and their supporting system and heat, ventilation, and air conditioning (HVAC) equipment, as a seismic Category I structure except for the penthouse that houses HVAC equipment. The penthouse is a seismic Category II structure. ESBWR DCD, Tier, 2 Section 3.5 describes the missile assessment for the ESBWR. The proposed changes to FSAR Tier 2, Subsection 1.5.1.1.2 reference the ESBWR DCD sections mentioned above.

The staff evaluated the ESBWR DCD and confirmed that the DCD provides design features to protect safety-related components against missiles. The staff evaluated the instrument location description in the applicant’s RAI response and the proposed changes to the FSAR. The staff determined that crediting the channel separation is an acceptable approach that provides reasonable protection against missiles. Therefore, the staff concludes that these features are in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as part of **Confirmatory Item 20.3-1**. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

Mounting

In Commission Order EA-12-051, Attachment 2, Section 1.3 states that the installed instrument channel equipment within the SFP shall be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the SFP structure.

The applicant’s response to RAI 01.05-6 noted that ESBWR DCD, Tier 2, Subsection 7.5.5.3.3 indicates that the SFP and the buffer pool instrumentation are seismically qualified and this includes the equipment mounting configuration. The proposed changes to FSAR Tier 2, Subsection 1.5.1.1.2 reference the ESBWR DCD section mentioned above.

The staff evaluated the RAI response and the proposed FSAR changes. The staff determined that designing the instrument and its mounting to be seismically qualified will ensure that both will retain their design functionality following a seismic event. The staff concludes that these features are in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as part of Confirmatory Item 20.3-1. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

Qualification

In Commission Order EA-12-051, Attachment 2, Section 1.4 states that primary and backup instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the SFP water at saturation conditions for an extended period.

The applicant's response to RAI 01.05-6 noted that ESBWR DCD, Tier 2, Section 9.1.3 indicates that both the SFP and the buffer pool each have two wide-range, safety-related level transmitters. ESBWR DCD, Tier 2, Subsection 7.5.5.3.3 indicates that the pool instrumentation is subject to environmental qualification and post-accident monitoring criteria. ESBWR DCD, Tier 2, Subsections 7.5.5.3.1 and 7.5.5.3.2 indicate that the pool instrumentation system conforms to quality standards for safety-related equipment. The ESBWR DCD credits the SFP pool level instruments as operational in environmental conditions consistent with boiling down to the top of the active fuel. These conditions would result in a high temperature (100 degrees Celsius [212 degrees Fahrenheit]), high humidity, steaming environment, loss of shielding, and high radiation doses. The proposed changes to FSAR Tier 2, Subsection 1.5.1.1.2 reference the ESBWR DCD sections mentioned above.

The staff reviewed the applicant's response and the proposed FSAR changes. The staff determined that the instrumentation will be designed to quality standards for safety-related equipment and to remain operational while exposed to the environmental conditions following an accident event. The staff finds that these features are in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as part of Confirmatory Item 20.3-1. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

Independence

In Commission Order EA-12-051, Attachment 2, Section 1.5 states that the primary instrument channel shall be independent of the backup instrument channel.

The applicant's response to RAI 01.05-6 noted that ESBWR DCD, Tier 2, Subsection 7.5.5.3.2 states that the instrument channels are physically and electronically independent, in accordance with GDC 24.

The staff reviewed the applicant's response and concludes that this feature is in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved.

Power Sources

In Commission Order EA-12-051, Attachment 2, Section 1.6 states that the permanently installed instrumentation channels shall each be powered by a separate power supply. Permanently installed and portable instrumentation channels shall provide for power connections from sources independent of the plant ac and direct current (dc) power distribution systems, such as portable generators or replaceable batteries.

The applicant's response to RAI 01.05-6 noted that ESBWR DCD, Tier 2, Subsection 7.5.5.3.2 states that the instrument channels are physically and electronically

independent, in accordance with GDC 24. The safety-related primary and backup instrumentation channels are controlled by the safety-related distributed control and information system (Q-DCIS). ESBWR DCD, Tier 2, Section 7.1.2 describes the divisional Q-DCIS components as powered by redundant, independent, and separated uninterruptible power supplies (UPSs) dedicated to their division with a battery backup (per division) for at least 72 hours. After 72 hours, the Q-DCIS can operate continuously on power from the ancillary diesel generators until offsite power is restored.

Commission Order EA-12-051 specifies that all permanently installed instrumentation channels are to be provided with power connections from sources independent of the plant ac and dc power distribution systems. The proposed changes to FSAR Tier 2, Subsection 1.5.1.1.2 state that the instrument channels will be provided with an alternate connection to sources independent of the plant ac and dc power distribution systems, such as portable generators or replaceable batteries, thus allowing for quick and accessible connections of sources. The alternate power source and replaceable batteries used for instrument channel power will have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.

The staff reviewed the applicant's response and the proposed changes to FSAR Subsection 1.5.1.1.2. The staff noted that the level instrument channels are powered by separated safety-related sources capable of powering the instruments for up to 72 hours. After 72 hours, the instrument channel can be powered by the ancillary diesel generators. In the event that these power sources are not available, the applicant's proposed changes to FSAR Subsection 1.5.1.1.2 state that these instrument channels will have the capability of being quickly connected to an alternate power source independent from the plant ac and dc power distribution systems. The staff evaluated the applicant's RAI response and the proposed FSAR changes. The staff concludes that these design features are in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as part of Confirmatory Item 20.3-1. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

Accuracy

In Commission Order EA-12-051, Attachment 2, Section 1.7 states that the instrument shall maintain its designed accuracy following a power interruption or a change in the power source without recalibration.

The applicant's response to RAI 01.05-6 and the proposed changes to FSAR Subsection 1.5.1.1.2 state that the instrument channels will be capable of maintaining the original accuracy following a power interruption or a change in power source without recalibration. The revised FSAR subsection also references ESBWR DCD, Tier 1, Table 2.6.2-2, which verifies that the instruments meet the minimum instrument accuracy of ±300 millimeters (mm) (±1 ft).

The staff reviewed the applicant's system description and the proposed FSAR changes. The staff concludes that these design features are in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as part of Confirmatory Item 20.3-1. The staff confirmed that these changes

have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

Testing

In Commission Order EA-12-05, Attachment 2, Section 1.8 states that the instrument channel design shall provide for routine testing and calibration.

The applicant's response to RAI 01.05-6 noted that ESBWR DCD, Tier 2, Subsection 9.1.3.4 indicates that the fuel and auxiliary pools cooling system (FAPCS) is designed to permit surveillance testing and in-service inspection of the safety-related components and the components required to perform the post-accident recovery functions in accordance with GDC 45, "Inspection of cooling water system," and American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC) Section XI. In addition, Fermi 3 COL Application Part 4, "Technical Specifications," Section 3.7.5, includes periodic surveillance of the fuel pools water level during the movement of irradiated fuel assemblies in the associated fuel storage pool or when irradiated fuel assemblies are stored in the associated fuel storage pool. The proposed changes to FSAR Tier 2, Subsection 1.5.1.1.2 reference the ESBWR DCD and the technical specifications sections mentioned above.

The staff reviewed the applicant's system description, the ESBWR design, and the proposed FSAR changes. The staff concludes that these design features are in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as part of Confirmatory Item 20.3-1. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

Display

In Commission Order EA-12-051, Attachment 2, Section 1.9 states that trained personnel shall be able to monitor the SFP water level from the control room, the alternate shutdown panel, or other appropriate and accessible locations. The display shall provide on-demand or continuous indication of the SFP water level.

The applicant's response to RAI 01.05-6 noted that ESBWR DCD, Tier 2, Section 9.1.3 states that both the SFP and the buffer pool each have two wide-range, safety-related, level transmitters that transmit signals to the main control room. These signals are used for on demand or continuous collapsed water level indications and to initiate high/low-level alarms, both locally and in the main control room. The proposed changes to FSAR Tier 2, Subsection 1.5.1.1.2 reference the ESBWR DCD section mentioned above.

The staff reviewed the applicant's system description and the proposed FSAR changes. The staff concludes that these design features are in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the proposed FSAR changes are in the next FSAR revision was being tracked as part of Confirmatory Item 20.3-1. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

Programs

In Commission Order EA-12-051, Attachment 2, Section 2 states that the SFP instrumentation shall be maintained to be available and reliable through the appropriate development and implementation of a training program. Personnel shall be trained in the use and maintenance (including test and calibration), and in the procedures for providing alternate power to the level instrument channels.

The applicant's response to RAI 01.05-6 stated that FSAR Section 13.2 includes a description of the training programs for operators and emergency response actions. FSAR Section 13.5 describes the development of procedures under the Plant Operating Procedures Development Plan that will address the procedures, testing, and calibration requirements of the installed instrument channels as identified in the Commission's order. In addition, the applicant has proposed new license condition in Section 3.8.3 to Part 10 of the COL application requiring that prior to fuel loading, the SFP and the buffer pool instrumentation shall be maintained to be available and reliable through the appropriate development and implementation of a training program. Personnel shall be trained in the use and the provision of alternate power to the safety-related level instrument channels.

The staff evaluated the applicant's RAI response and the proposed license condition. The staff finds that the program descriptions provided are in conformance with Commission Order EA-12-051 and the guidance in JLD-ISG-2012-03. Therefore, this part of RAI 01.05-6 is resolved. Confirmation that the license condition changes are in the next revision of the COL application, Part 10, Section 3.8.3, was being tracked as part of Confirmatory Item 20.3-1. The staff confirmed that these changes have been incorporated into the Fermi 3 COL FSAR. Therefore, this part of Confirmatory Item 20.3-1 is closed.

20.3.5 Post Combined License Activities

For the reasons discussed in the "Technical Evaluation" section above, the staff proposes to include the following license condition related to the SFP instrumentation.

> **License Condition (20.3-1)**: Reliable Spent Fuel Pool/Buffer Pool Level Instrumentation
>
> Prior to initial fuel load, DTE Electric Company shall address the following requirements using the guidance contained in JLD-ISG-2012-03, "Compliance with Order EA-2012-051, Reliable Spent Fuel Pool Instrumentation," Revision 0:
>
> The spent fuel pool/buffer pool instrumentation shall be maintained available and reliable through the development and implementation of a training program. The training program shall include provisions to ensure trained personnel can route the temporary power lines from the alternate power source to the appropriate connection points, and connect the alternate power source to the safety-related level instrument channels.

20.3.6 Conclusion

The staff evaluated the applicant's RAI responses, the current FSAR, the proposed license condition, and the proposed FSAR changes related to the SFP water level instrumentation. The staff concludes that these instruments are designed in accordance with the guidance in

JLD-ISG-2012-03. Therefore, these instruments are considered reliable, able to withstand beyond-design-basis natural phenomena, and able to monitor key SFP level parameters as described in Commission Order EA-12-051.

20.4 Recommendation 9.3, Emergency Preparedness

20.4.1 Introduction

The accident at Fukushima reinforced the need for effective EP. The objective of EP is to ensure that the capability exists for a licensee (or COL applicant) to implement measures that mitigate the consequences of a radiological emergency and to provide for protective actions of the public. The accident at Fukushima highlighted the need to determine the staff needed to respond to a multi-unit event. Additionally, there is a need to ensure that the communication equipment relied on has adequate power to coordinate the response to an event during an ELAP.

20.4.2 Summary of Application

In the response to RAI 01.05-2 dated April 18, 2013 (ADAMS Accession No. ML13109A426), the applicant proposed the following license condition related to EP communications and staffing to address Fukushima NTTF Recommendation 9.3:

> Communications:
>
> At least two (2) years prior to scheduled initial fuel load, the licensee [Detroit Edison] shall have performed an assessment of on-site and offsite communications systems and equipment required during an emergency event to ensure communications capabilities can be maintained during prolonged station blackout conditions. The communications capability assessment will be performed in accordance with NEI 12–01, “Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities,” Revision 0.
>
> At least one hundred eighty (180) days prior to scheduled initial fuel load, the licensee [Detroit Edison] shall complete implementation of corrective actions identified in the communications capability assessment described above, including any related emergency plan and implementing procedure changes and associated training.
>
> Staffing:
>
> At least two (2) years prior to scheduled initial fuel load, the licensee [Detroit Edison] shall have performed assessments of the on-site and augmented staffing capability to satisfy the regulatory requirements for response to a multi-unit event. The staffing assessments will be performed in accordance with NEI 12-01, “Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities”, Revision 0.
>
> At least two (2) years prior to scheduled initial fuel load, the licensee [Detroit Edison] shall revise the Fermi 3 Emergency Plan to include the following:

- Incorporation of corrective actions identified in the staffing assessments described above.

- Identification of how the augmented staff will be notified given degraded communications capabilities.

20.4.3 Regulatory Basis

The requirements for EP for beyond-design-basis external events are established or described in the following:

- 10 CFR 50.47(b)(6) states that provisions exist for prompt communications among principal response organizations to emergency personnel and to the public.

- 10 CFR 50.47(b)(1) states, in part, "and each principal response organization has staff to respond and to augment its initial response on a continuous basis."

- 10 CFR 50.47(b)(2) states, in part, "adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available …"

- 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," Section IV. E.9 states that adequate provisions shall be made and described for emergency facilities and equipment including "at least one onsite and one offsite communications system; each system shall have a backup power source."

The guidance for EP for beyond-design-basis external events is established or described in the following:

- SECY-12-0025 states, in part, that the staff will also request all COL applicants to provide information required by the orders and request for information letters described in this paper, as applicable, through the review process.

- NEI 12–01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities", Revision 0 - By NRC letter from David Skeen, Director, Japan Lessons-Learned Directorate, to NEI, Susan Perkins-Grew, Director, Emergency Preparedness, dated May 15, 2012, NRC finds the guidance in NEI 12-01 to be an acceptable method for licensees to employ when responding to the 10 CFR 50.54(f) letters regarding NTTF Recommendation 9.3 (ADAMS Accession No. ML12131A043).

- NUREG–0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Section B, "Onsite Emergency Organization," states (in part),

  > 5. Each licensee shall specify... functional areas of emergency activity...These assignments shall cover the emergency functions in Table B-1 entitled, "Minimum Staffing Requirements for Nuclear Power Plant Emergencies." The minimum on-shift staffing shall be as indicated in Table B-1. The licensee must be able to augment on-shift capabilities

within a short period after declaration of an emergency. This capability shall be as indicated in Table B-1...

- NUREG–0696, "Functional Criteria for Emergency Response Facilities," offers guidance on how to meet the requirements of Appendix E to 10 CFR Part 50 and describes the onsite and offsite communications requirements for the licensee's emergency response facilities.

20.4.4 Technical Evaluation

In RAI Letter 77 dated May 17, 2012 (ADAMS Accession No. ML12137A770); and RAI Letter 79 dated August 7, 2012 (ADAMS Accession No. ML12216A305), the NRC issued RAI 01.05-2 and RAI 13.03-65, respectively, requesting the applicant to provide information concerning the implementation of Fukushima NTTF Recommendation 9.3. In the responses to RAI 01.5-2 dated April 18, 2013 (ADAMS Accession No. ML13109A426), and RAI 13.03-65 dated April 30, 2013 (ADAMS Accession No. ML13123A076), the applicant proposed a license condition to address the requested information in each RAI and to meet the information requests of the 10 CFR 50.54(f) letters sent to existing licensees—including COL applicants—regarding communications and staffing for NTTF Recommendation 9.3. The proposed license condition is listed in Section 20.4.2 of this SER. As part of the license condition, the applicant is committed to perform communication and staffing assessments using the guidance in NEI 12–01, Revision 0 (ADAMS Accession No. ML12125A412). In a letter from the NRC to NEI dated May 15, 2012 (ADAMS Accession No. ML1213A043), the NRC stated that the guidance in NEI 12–01, Revision 0 provides an acceptable method for licensees to employ when responding to the 10 CFR 50.54(f) letters regarding NTTF Recommendation 9.3. The applicant proposed the license condition on communications and staffing in Section 3.8.1 to Part 10 of the COL application. However, the NRC staff has revised the timeframe of the completion of this license condition to be consistent with the schedules provided in 10 CFR 52.99 (a) and 10 CFR 52.103(a). Confirmation that the proposed license condition related to EP is in the next revision of the COL application, Part 10, was being tracked as **Confirmatory Item 20.4-1**. The staff reviewed the applicant's proposed license condition and revised it to reflect the NRC's expectation when addressing NTTF Recommendation 9.3 as stated below in Section 20.4.5 of this SER. Therefore, Confirmatory Item 20.4-1 is closed.

20.4.5 Post Combined License Activities

For the reasons discussed in the "Technical Evaluation" section above, the staff proposes to include the following license conditions related to communications and staffing for emergency planning actions:

License Condition (20.4-1): Emergency Planning Actions

Prior to initial fuel load, DTE Electric Company will fully implement the following requirements for emergency planning actions related to communications and staffing.

Communications:

At least 18-months before the latest date set forth in the schedule submitted in accordance with 10 CFR 52.99(a) for completing the inspections, tests, and analyses in the ITAAC, DTE Electric Company shall have performed an assessment of on-site

and off-site communications systems and equipment required during an emergency event to ensure communications capabilities can be maintained during prolonged station blackout conditions. The communications capability assessment will be performed in accordance with NEI 12–01, “Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities”, Revision 0.

At least one hundred eighty (180) days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a), DTE Electric Company shall complete implementation of corrective actions identified in the communications capability assessment described above, including any related emergency plan and implementing procedure changes and associated training.

Staffing:

At least 18-months before the latest date set forth in the schedule submitted in accordance with 10 CFR § 52.99(a)for completing the inspections, tests, and analyses in the ITAAC, DTE Electric Company shall have performed assessments of the on-site and augmented staffing capability to satisfy the regulatory requirements for response to a multi-unit event. The staffing assessments will be performed in accordance with NEI 12–01, “Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities”, Revision 0.

At least 180 days before the date scheduled for initial fuel load set forth in the notification submitted in accordance with 10 CFR § 52.103(a), DTE Electric Company shall revise the Fermi 3 Emergency Plan to include the following:

- Incorporation of corrective actions identified in the staffing assessments described above.

- Identification of how the augmented staff will be notified given degraded communications capabilities.

20.4.6 Conclusion

The staff reviewed the applicant’s proposed license condition on communications and staffing in Section 3.8.1 to Part 10 of the COL application. The staff concludes that the license condition, as revised by the staff, is acceptable because it conforms to the guidance in SECY-12-0025 and NEI 12–01 regarding communications and staffing to address NTTF Recommendation 9.3; in NUREG–0654/FEMA-REP-1; and in NUREG–0696; and meets the applicable requirements of 10 CFR 50.47(b) and Appendix E.

APPENDIX A. POST COMBINED LICENSE ACTIVITIES – LICENSE CONDITIONS, INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA, AND FINAL SAFETY ANALYSIS REPORT COMMITMENTS

A.1 License Conditions

The United States (U.S.) Nuclear Regulatory Commission's (NRC's) regulations at Title 10 of the *Code of Federal Regulations* (10 CFR) 52.97, "Issuance of combined licenses," requires a combined license (COL) to specify any terms and conditions of the COL the Commission deems appropriate. A license condition is not needed when an existing NRC regulation requires a future regulatory review of a matter to ensure adequate safety during design, construction, inspection activities or operation for a new plant. The staff is proposing that the Commission include the following license conditions, which are set forth below, to control various safety matters.

Proposed License Condition	SER Section	Description
1-1	1.4.5.6	Subject to the conditions and requirements incorporated herein, the Commission hereby licenses DTE: (a).(i) Pursuant to the AEA and 10 CFR Part 70, to receive and possess at any time special nuclear material as reactor fuel in accordance with the limitations for storage and in the amounts necessary for reactor operation, as described in the FSAR as supplemented and amended. (ii) Pursuant to the AEA and 10 CFR Part 70, to use special nuclear material as reactor fuel, after a Commission finding under 10 CFR 52.103(g) has been made, in accordance with the limitations for storage and in amounts necessary for reactor operation, described in the FSAR, as supplemented and amended; (b).(i) Pursuant to the AEA and 10 CFR Parts 30 and 70, to receive, possess, and use, at any time before a Commission finding under 10 CFR 52.103(g), such byproduct and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts, as necessary; (ii) Pursuant to the AEA and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, after a Commission finding under 10 CFR 52.103(g) any

		byproduct, source, and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as necessary; (c). (i) Pursuant to the AEA and 10 CFR Parts 30 and 70, to receive, possess, and use, before Commission finding under 10 CFR 52.103(g), in amounts not exceeding those specified in 10 CFR 30.35(d) and 10 CFR 70.25(d) required for establishing decommissioning financial assurance, any byproduct or special nuclear material that is (1) in unsealed form; (2) on foils or plated surfaces, or (3) sealed in glass, for sample analysis or instrument calibration or other activity associated with radioactive apparatus or components; (ii) Pursuant to the AEA and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, after a Commission finding under 10 CFR 52.103(g), in amounts as necessary, any byproduct, source, or special nuclear material without restriction as to chemical or physical form, for sample analysis or instrument calibration or other activity associated with radioactive apparatus or components by not uranium hexafluoride; and (d). Pursuant to the AEA and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.
1-2	1.4.5.6	Before the initial receipt of special nuclear materials (SNM) onsite, the licensee shall implement the SNM Material Control and Accounting Program. No later than 12 months after issuance of the COL, the licensee shall submit to the Director of Office of New Reactors (NRO) a schedule that supports planning for and conduct of NRC inspections of the SNM Material Control and Accounting program. The schedule shall be update every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the SNM Material Control and Accounting program has been fully implemented.

1-3	1.4.5.6	The fire protection measures in accordance with RG 1.189 for designated storage building areas (including adjacent fire areas that could affect the storage area) shall be implemented before initial receipt of byproduct or special nuclear materials that are not fuel (excluding exempt quantities as described in 10 CFR 30.18).
1-4	1.4.5.6	The fire protection measures in accordance with RG 1.189 for areas associated with new fuel (including all fuel handling, fuel storage, and adjacent fire areas that could affect the new fuel) shall be implemented before receipt of fuel onsite.
1-5	1.4.5.6	Before the receipt of fuel onsite, a formal letter of agreement shall be in place with the local fire department specifying the nature of arrangements in support of the Fire Protection Program.
1-6	1.4.5.6	All fire protection program features shall be implemented before initial fuel load.
2.2.3-1	2.2.3.5	The applicant shall use tanks with a maximum capacity of 1,000 gallons for the onsite storage of propane. No more than 1,000 gallons of propane will be stored in any single location, and no storage location will be located closer than the minimum safe distance of 854 meters (2,800 feet) from any Fermi 3 safety-related structure and from the MRC.
2.5.3-1	2.5.3.5	The applicant shall perform detailed geologic mapping of excavations for safety-related structures; examine and evaluate geologic features discovered in those excavations; and notify the Director of the Office of New Reactors, or the Director's designee, once excavations for safety-related structures are open for examination by NRC staff.
3.5	3.11.5	"Operational Program Implementation," in Part 10 of the Fermi 3 COL application includes a Proposed License Condition in 3.5.7 related to the EQ Program. This license condition will require the EQ Program to be implemented prior to initial fuel load.
3.6	3.11.5	"Operational Program Readiness," in Part 10 of the Fermi COL application will require the licensee to develop a schedule that supports planning for and conduct of NRC inspection of the operational programs listed in Fermi 3 COL FSAR Table 13.4-201, "Operational Program Required by NRC Regulations." This schedule must be available to the NRC staff no later than 12 months after issuance of the COL. The condition will also require that the schedule be updated every 6 months until 12 months before scheduled fuel

		load, and every month thereafter until the operational programs listed in the Fermi 3 COL FSAR Table 13.4-201 have been fully implemented or the plant has been placed in commercial service, whichever comes first.
3.9-1	3.9.5	FSAR Section 13.4 indicates that FSAR Table 13.4-201 lists each operational program, the regulatory source for the program, the associated implementation milestones, and the FSAR section where the operational program is fully described, as discussed in RG 1.206. RG 1.206, Regulatory Position C.IV.4.3 states that the COL will contain a license condition that requires the licensee to submit to the NRC a schedule that supports planning and conducting NRC inspections of operational programs. The schedule must be submitted 12 months after the NRC issues the COL. The schedule will be updated every 6 months until 12 months before the scheduled fuel loading, and every month thereafter until either the operational programs in FSAR Table 13.4-201 have been fully implemented or the plant has been placed in commercial service, whichever comes first.
3.9-2	3.9.5	Consistent with the licensing of other passive design new reactors, the NRC has prepared a license condition directing the implementation of a surveillance program for squib valves in the gravity driven cooling system (GDS) and the automatic depressurization system (ADS) at Fermi 3 before fuel load to supplement the inservice testing requirements in the ASME OM Code. The license condition is as follows: Before initial fuel load, the licensee shall implement a surveillance program for explosively actuated valves (squib valves) in the GDCS and the ADS at Fermi 3 that includes the following provisions in addition to the requirements specified in the ASME *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) as incorporated by reference into 10 CFR 50.55a. a. Preservice Testing All explosively actuated valves shall be preservice tested by verifying the operational readiness of the actuation logic and associated electrical circuits for each explosively actuated valve with its pyrotechnic charge removed from the valve. This must include confirmation that sufficient electrical parameters (voltage, current, resistance) are available at the explosively actuated valve from each circuit that is relied upon to actuate the valve. In addition, a

		sample of at least 20 percent of the pyrotechnic charges in all explosively actuated valves shall be tested in the valve or a qualified test fixture to confirm the capability of each sampled pyrotechnic charge to provide the necessary motive force to operate the valve to perform its intended function without damage to the valve body or connected piping. The sampling must select at least one explosively actuated valve from each redundant safety train. Corrective action shall be taken to resolve any deficiencies identified in the operational readiness of the actuation logic or associated electrical circuits, or the capability of a pyrotechnic charge. If a charge fails to fire or its capability is not confirmed, all charges with the same batch number shall be removed, discarded, and replaced with charges from a different batch number that has demonstrated successful 20 percent sampling of the charges. b. Operational Surveillance Explosively actuated valves shall be subject to the following surveillance activities after commencing plant operation: (1) At least once every 2 years, each explosively actuated valve shall undergo visual external examination and remote internal examination (including evaluation and removal of fluids or contaminants that may interfere with operation of the valve) to verify the operational readiness of the valve and its actuator. This examination shall also verify the appropriate position of the internal actuating mechanism and proper operation of remote position indicators. Corrective action shall be taken to resolve any deficiencies identified during the examination with post-maintenance testing conducted that satisfies the preservice testing requirements. (2) At least once every 10 years, each explosively actuated valve shall be disassembled for internal examination of the valve and actuator to verify the operational readiness of the valve assembly and the integrity of individual components and to remove any foreign material, fluid, or corrosion. The examination schedule shall provide for each valve design used for explosively actuated valves at the facility to be included among the explosively actuated valves to be disassembled and examined every 2 years. Corrective action

		shall be taken to resolve any deficiencies identified during the examination with post-maintenance testing conducted that satisfies the PST requirements. (3) For explosively actuated valves selected for test sampling every 2 years in accordance with the ASME OM Code, the operational readiness of the actuation logic and associated electrical circuits shall be verified for each sampled explosively actuated valve following removal of its charge. This must include confirmation that sufficient electrical parameters (voltage, current, resistance) are available for each valve actuation circuit. Corrective action shall be taken to resolve any deficiencies identified in the actuation logic or associated electrical circuits. (4) For explosively actuated valves selected for test sampling every 2 years in accordance with the ASME OM Code, the sampling must select at least one explosively actuated valve from each redundant safety train. Each sampled pyrotechnic charge shall be tested in the valve or a qualified test fixture to confirm the capability of the charge to provide the necessary motive force to operate the valve to perform its intended function without damage to the valve body or connected piping. Corrective action shall be taken to resolve any deficiencies identified in the capability of a pyrotechnic charge in accordance with the PST requirements. This license condition shall expire upon the (1) incorporation of the above surveillance provisions for explosively actuated valves into the facility's inservice testing program; or (2) incorporation of inservice testing requirements for explosively actuated valves in new reactors (i.e., plants receiving a construction permit, or a combined license for construction and operation after January 1, 2000) to be specified in a future edition of the ASME OM Code as incorporated by reference into 10 CFR 50.55a, including any conditions imposed by the NRC into the facility's inservice testing program. This license condition supplements the current requirements in the ASME OM Code for explosively actuated valves, and sets forth requirements for both pre-service testing and operational surveillance, as well as any necessary corrective action. The license condition will expire when either (1) the license

		condition is incorporated into the Fermi 3 IST program; or (2) the updated ASME OM Code requirements for squib valves in new reactors, as accepted by the NRC in 10 CFR 50.55a, are incorporated into the Fermi 3 IST program. For the purpose of satisfying the license condition, the licensee retains the option of including in its IST program either the requirements stated in this condition, or including updated ASME Code requirements.
3.9-3	3.9.5	Steam Dryer Monitoring Plan 1. The licensee shall prepare a Steam Dryer Monitoring Plan (SDMP) and submit the SDMP to the NRC no later than 90 days before the scheduled date for initial fuel loading. 2. The licensee shall provide Power Ascension Test (PAT) procedures for steam dryer monitoring to the NRC resident inspectors at least 10 days before the scheduled date for initial fuel loading. The PAT procedures must include the following: • Level 1 and Level 2 acceptance limits, as defined in Report NEDE-33313P (Revision 5, December 2013), for on-dryer strain gage and on-dryer accelerometer measurements to be used up to 100 percent power; • The power levels at which the steam dryer will be monitored (subject to Conditions 3 and 4) during power ascension, and the duration of monitoring at each power level; • A description of activities to be accomplished during monitoring at each power level; • Plant parameters to be monitored; • A description of the actions to be taken if acceptance criteria are not satisfied; and • A description of the process for verification of the completion of commitments and planned actions specified in the PAT procedures.

		3. The licensee shall complete the actions specified in Item 2 of the model license condition specified in paragraph (c) of Section 10.2, “Comprehensive Vibration Program Elements for a COL Applicant,” in NEDE-33313P (Revision 5) between 65 and 75 percent thermal power. 4.. DTE shall measure, record, and evaluate pressures, strains, and accelerations from the steam dryer instrumentation at power levels approximately 5 percent higher than the previous power level at which DTE measured, recorded, and evaluated such parameters until 100 percent thermal power is reached. DTE shall generate data trending and a projection of strain levels for each successive power level, including full power. DTE shall use data trending analysis to assess whether the Level 1 or Level 2 acceptance limits would be exceeded at the next higher power level for which the PAT specifies monitoring. DTE shall provide the data trending results and revised limit curves to the NRC project manager by facsimile or electronic transmission. 5. At each power level for which Conditions 3 and 4 require steam dryer monitoring, DTE shall measure and record pressure, strain, and acceleration responses over a range of plant conditions sufficient to confirm that loading and fatigue effects from normal variations in plant conditions at power levels up to and including 100 percent thermal power will not adversely affect the life of the dryer. DTE shall include its evaluation of steam dryer performance during such variations in plant conditions, including during Power Maneuvering in the Feedwater Temperature Operating Domain testing, in the dryer structural response as part of the full stress analysis report described in Condition 9 below. 6. If a flow-induced resonance is identified at any power level at which Conditions 3 and 4 require steam dryer monitoring, and the strains or vibrations exceed the pre-determined Level 1 or Level 2 limit curve, DTE shall cease power ascension until completing the actions specified in Item 5 of the model license condition specified in paragraph (c) of Section 10.2 in NEDE--33313P (Revision 5) and the following:

		a. If a Level 1 limit curve is exceeded, DTE shall reduce power to the last power level at which DTE performed steam dryer monitoring pursuant to Conditions 3 and 4 and at which the Level 1 limit curve was not exceeded. DTE shall perform a stress analysis to develop a new Level 1 limit curve before increasing power to the next level at which Conditions 4 requires steam dryer monitoring. b. If a Level 2 limit curve is exceeded, or if data trending indicates that a Level 1 limit curve may be challenged before the next power level at which Conditions 4 requires steam dryer monitoring is reached, DTE shall evaluate the Level 1 and Level 2 limit curves and perform a stress analysis that demonstrates that the stress acceptance limits are satisfied at the higher power level before power is increased. 7. DTE shall determine end-to-end bias and uncertainties by comparing the predicted and measured strain or acceleration on the steam dryer at each power level at which DTE performs steam dryer monitoring pursuant to Conditions 3 and 4 and confirm the conservatism of the predicted dryer stress field. At each such power level, DTE shall adjust the predicted strain and acceleration responses using the frequency-dependent end-to-end bias errors and uncertainty values. If any of the measured sensor data at that power level exceeds the adjusted predictions, DTE shall either (A) modify the bias errors and uncertainty values and limit curves and ensure measured sensor responses do not exceed the adjusted predictions, or (B) quantitatively evaluate the effect on fatigue life. 8. At the initial power level at which Condition 3 requires steam dryer monitoring and at approximately 85 and 95 percent power, DTE shall provide the steam dryer data analysis and results to the NRC project manager by facsimile or electronic transmission; and shall not exceed the power level at which it performed the steam dryer monitoring for at least 72 hours after the NRC project manager has confirmed receipt of the transmission. 9.. DTE shall provide data collected from the steam dryer monitoring required by Condition 4 at

		100 percent power to the NRC project manager by facsimile or electronic transmission within 72 hours of completing the collection of that data, with receipt confirmation from the NRC project manager. DTE shall submit a full stress analysis report and evaluation to the NRC document control desk in accordance with 10 CFR 52.4 within 90 days of first reaching 100 percent thermal power. The report must include the minimum stress ratio and the final dryer load definition using steam dryer data, and associated bias errors and uncertainties, and must demonstrate that the steam dryer will maintain its structural integrity over its design life considering variations in plant parameters, including, but not limited to, reactor pressure and core flow rate. If the structural integrity of the steam dryer for the full plant life is not demonstrated by the stress analysis, DTE shall describe its compensatory actions, such as future dryer replacement, in the stress analysis report. 10. The licensee shall implement a periodic steam dryer inspection program as follows: a. During the first two refueling outages after first reaching 100 percent thermal power, DTE shall perform a visual inspection of all accessible areas and susceptible locations of the steam dryer in accordance with industry guidance on steam dryer inspections in the latest NRC staff-approved version of BWRVIP-139-A, “BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation Guidelines,” with any conditions or limitations specified in the NRC staff approval. The results of these baseline inspections shall be submitted to the NRC within 60 days following startup after each outage. b. At the end of the second refueling outage after reaching 100 percent thermal power, DTE shall update the Steam Dryer Monitoring Program to include a long-term inspection plan based on plant-specific and industry operating experience, and shall submit the updated program to the NRC within 180 days following startup from the second refueling outage.

5.3.1-1	5.3.1.5	The licensee shall implement a complete Reactor Vessel (RV) Material Surveillance Program prior to fuel load.
5.3.1-2	5.3.1.5	No later than 12 months after issuance of the COL, the licensee shall submit to the Director of NRO a schedule that supports planning for, and the conducting of, NRC inspections of the preservice inspection and ISI programs. The schedule shall be updated every 6 months until 12 months before schedule fuel loading, and every month thereafter until either the PSI or ISI programs have been fully implemented.
5.3-2	5.3.2.5	Prior to fuel load, the pressure-temperature limit curves will be updated to reflect plant-specific material properties, if required.
5.4.4-1	5.2.4.5	The licensee shall submit to the appropriate Director of the NRO, a schedule, no later than 12 months after issuance of the COL, for implementation of the operational programs listed in FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the operational programs in the FSAR table have been fully implemented.
11-1	11.4.5	At least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a), DTE Electric Company shall implement an operational program for process and effluent monitoring and sampling, including the subprogram and documents for a PCP. No later than 12 months after issuance of the COL, the licensee shall submit to the Director of the Office of New Reactors (NRO) a schedule that supports planning for and conducting of NRC inspections of the operational program for process and effluent monitoring and sampling (including the PCP). The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the operational program for process and effluent monitoring and sampling (including the PCP) has been fully implemented. (COM 13.4-011)

11-2	11.5.5	At least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a), DTE Electric Company shall implement an operational program for process and effluent monitoring and sampling, including the following subprograms and documents: a. Radiological Effluent Technical Specifications/Standard Radiological Effluent Controls (COM 13.4-007) b. Offsite Dose Calculation Manual (COM 13.4-009) c. Radiological Environmental Monitoring Program (COM 13.4-010) No later than 12 months after issuance of the COL, the licensee shall submit to the Director of the NRO a schedule that supports planning and conducting NRC inspections of the operational program for process and effluent monitoring and sampling (including Radiological Effluent Technical Specifications/Standard Radiological Effluent Controls, the Offsite Dose Calculation Manual, and the Radiological Environmental Monitoring Program). The schedule shall be updated every 6 months until 12 months before scheduled fuel loading and every month thereafter, until the above operational program has been fully implemented.
12.3-1	12.3.5	Prior to initial fuel load, the licensee shall implement an operational program for lifecycle minimization of contamination.
12.3-2	12.3.5	No later than 12 months after issuance of the COL, the licensee shall submit to the Director of the Office of New Reactors (NRO) a schedule that supports planning for and conduct of NRC inspections of the operational program (for lifecycle minimization of contamination). The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until this operational program has been fully implemented.
12.5-1	12.5.5	The licensee shall implement the Radiation Protection Program (RPP), (including the ALARA principle) or applicable portions thereof, on or before the associated milestones identified below: a. Receipt of Materials – Prior to initial receipt of byproduct, source, or special nuclear materials onsite (excluding exempt quantities as described in 10 FR 30.18, “Exempt quantities.”) b. Fuel Receipt – Prior to initial receipt and storage of fuel onsite

		c. Fuel Loading – Prior to initial fuel load d. Waste Shipment – Prior to first radioactive waste shipment
12.5-2	12.5.5	No later than 12 months after issuance of the COL, the licensee shall submit to the Director NRO a schedule that supports planning for and conduct of NRC inspections of the operational program (Radiation Protection Program). The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until this operational program has been fully implemented
13.3-1	13.3.5	The licensee shall submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07 01, Revision 0, with no deviations. The EAL scheme shall have been discussed and agreed upon with State and local officials. The fully developed site-specific EAL scheme shall be submitted to the NRC at least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a).
13.3-2	13.3.5	License Condition COL application Part 10 – The applicant shall execute formal Letters of Agreement with State and local agencies with Emergency Plan responsibilities prior to fuel load. These Letters of Agreement will identify the specific nature of arrangements in support of emergency preparedness for operation of the proposed new nuclear unit. The Emergency Plan shall be revised to include these Letters of Agreement after they have been executed.
13.3-3	13.3.5	The licensee shall conduct a detailed analysis of on-shift staffing, in accordance with the NRC endorsed version of NEI 10-05, “Assessment of On-Shift Emergency Response Organization Staffing and Capabilities,” Revision 0, and the licensee shall incorporate any changes to the Emergency Plan needed to bring staffing to the required levels, prior to or concurrent with completion of Emergency Plan ITAAC 2.0 of Emergency Plan ITAAC Table 2.3.1.
13.4-1	13.4.5	In FSAR Table 13.4-201, the applicant identifies the implementation milestones for each operational program. These implementation milestones, the schedule for which is required to be submitted and updated in accordance with the license condition described above, specify activities to be completed following issuance of the COL. Implementation of each operational

		program will be evaluated by the staff according to the respective implementation milestone.
13.6-1	13.6.5	No later than 12 months after issuance of the COL, the licensee shall submit to the Director of NRO, or the Director's designee, a schedule for implementation of the operational programs listed in FSAR Table 13.4-201, including the associated estimated date for initial loading of fuel. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the operational programs in the FSAR table have been fully implemented.
13.6A-1	13.6A.5	The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the operational programs in the FSAR table have been fully implemented. This schedule shall also address: a. The implementation of site specific Severe Accident Management Guidance. b. The spent fuel rack coupon monitoring program implementation.
14-1	14.2.5	<u>Startup Administration Manual</u> Prior to initiating the plant's initial test program (ITP), a site specific startup administrative manual (procedures), which includes administrative procedures and requirements that govern the activities associated with the plant ITP is to be provided to on-site NRC inspectors 60 days prior to their intended use.
	14.2.5	<u>Preoperational Startup Test Procedures</u> During the post-licensing period, preoperational and startup test procedures will be subject to a license condition for NRC inspections to verify that the licensee implements the ITP. This process will allow for the performance of necessary plant as-built inspections and walk downs. The licensee will make available to on-site NRC inspectors preoperational and startup test procedures 60 days prior to their intended use.
	14.2.5	<u>Site-Specific Preoperational and Startup Test Procedures</u>

		During the post-licensing period, site-specific preoperational and startup test procedures will be subject to NRC inspections to verify that the licensee implements the ITP. This process will allow for the performance of necessary plant as-built inspections and walk downs. The licensee will make available to on-site NRC inspectors site-specific preoperational and startup test procedures 60 days prior to their intended use.
	14.2.5	<u>Power Ascension Test Phase Reports</u> Certain milestones in the startup testing phase of the ITP (e.g., pre-critical testing, criticality testing, and low-power testing) should be controlled through this license condition to ensure that the designated licensee management reviews, evaluates, and approves relevant test results before proceeding to the power ascension test phase. Accordingly, the licensee shall perform the following: (a)Following completion of all pre-critical and criticality testing, the licensee shall confirm that the test results are within the range of values predicted in the acceptance criteria in the facility's FSAR. Following these licensee confirmations; the licensee will conduct low-power tests and operate the facility at reactor steady-state core power levels not in excess of 5 percent power, in accordance with the conditions of the license. (b)Following completion of all low-power testing the licensee shall confirm that the test results are within the range of values predicted in the acceptance criteria in the facility's FSAR. After completing and evaluating low-power test results, the licensee will conduct power ascension testing and will operate the facility at reactor steady-state core power levels not in excess of 100 percent power, in accordance with the conditions of the license. The licensee is responsible for the review and evaluation of the adequacy of test results presented in the Power Ascension Test Phase reports, as well as final review of overall test results in these reports. Test results, which do not meet acceptance criteria, are identified and corrective actions and retests are performed. The Power Ascension Test Phase reports shall be made available to on-site NRC inspectors.
	14.2.5	<u>Test Changes</u> Within one month of any ITP changes described in the Fermi 3 FSAR, Section 14.2, the licensee shall evaluate

		these changes in accordance with the provisions of 10 CFR 50.59 or the change process defined in the 10 CFR Part 52, Appendix E, Section VIII, and report them in accordance with 10 CFR 50.59(d).
	14.2.5	Operational Program Readiness The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first. This schedule shall also address: a. The implementation of site specific Severe Accident Management Guidance. b. The spent fuel rack coupon monitoring program implementation.
19A-1	19.A.5	The licensee shall submit to the appropriate Director of the NRO, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of operational programs listed in the operational program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first. This schedule shall also address: a. The implementation of site specific Severe Accident Management Guidance. b. The spent fuel rack coupon monitoring program implementation.
20.2-1	20.2.5	Mitigation Strategies for Beyond-Design-Basis External Events a. DTE Electric Company shall complete development of an overall integrated plan of strategies to mitigate a beyond-design-basis external event at least 1 year before the completion of the last ITAAC on the schedule required by 10 CFR 52.99(a). b. The overall integrated plan required by this condition must include guidance and

		strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities. The overall integrated plan must include provisions to ensure that all accident mitigation procedures and guidelines (including the guidance and strategies required by this section, emergency operating procedures, abnormal operating procedures, and extensive damage management guidelines) are coherent and comprehensive. c. The guidance and strategies required by this condition must be capable of (i) mitigating a simultaneous loss of all alternating current (ac) power and loss of normal access to the normal heat sink and (ii) providing for adequate capacity to perform the functions upon which the guidance and strategies rely for all units on the Fermi site and in all modes at each unit on the site. d. Before initial fuel load, DTE Electric Company shall fully implement the guidance and strategies required by this condition, including: 1. Procedures; 2. Training; 3. Acquisition, staging, or installation of equipment and consumables relied upon in the strategies; and 4. Configuration controls and provisions for maintenance and testing (including testing procedures and frequencies for preventative maintenance) of the equipment upon which the strategies and guidance required by this condition rely. e. The training required by condition d.2 must use a Systematic Approach to Training (SAT) to evaluate training for station personnel, and must be based upon plant equipment and procedures upon which the guidance and strategies required by this section rely. f. DTE Electric Company shall maintain the

		guidance and strategies described in the application upon issuance of the license, and the integrated plan of strategies upon its completion as required by condition a. DTE may change the strategies and guidelines required by this Condition provided that DTE evaluates each such change to ensure that the provisions of conditions b and c continue to be satisfied and DTE documents the evaluation in an auditable form.
20.3-1	20.3.5	Reliable Spent Fuel Pool/Buffer Pool Level Instrumentation Prior to initial fuel load, DTE Electric Company shall address the following requirements using the guidance contained in JLD-ISG-2012-03, “Compliance with Order EA-2012-051, Reliable Spent Fuel Pool Instrumentation,” Revision 0: The spent fuel pool/buffer pool instrumentation shall be maintained available and reliable through the development and implementation of a training program. The training program shall include provisions to ensure trained personnel can route the temporary power lines from the alternate power source to the appropriate connection points, and connect the alternate power source to the safety-related level instrument channels.
20.4-1	20.4.5	Emergency Planning Actions Prior to initial fuel load, DTE Electric Company will fully implement the following requirements for emergency planning actions related to communications and staffing. Communications: At least 18-months before the latest date set forth in the schedule submitted in accordance with 10 CFR 52.99(a) for completing the inspections, tests, and analyses in the ITAAC, DTE Electric Company shall have performed an assessment of on-site and off-site communications systems and equipment required during an emergency event to ensure communications capabilities can be maintained during prolonged station blackout conditions. The communications capability assessment will be performed in accordance with NEI 12–01, “Guideline for Assessing Beyond Design Basis Accident Response Staffing and

		Communications Capabilities", Revision 0. At least one hundred eighty (180) days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a), DTE Electric Company shall complete implementation of corrective actions identified in the communications capability assessment described above, including any related emergency Staffing: At least 18-months before the latest date set forth in the schedule submitted in accordance with 10 CFR § 52.99(a)for completing the inspections, tests, and analyses in the ITAAC, DTE Electric Company shall have performed assessments of the on-site and augmented staffing capability to satisfy the regulatory requirements for response to a multi-unit event. The staffing assessments will be performed in accordance with NEI 12–01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities", Revision 0. At least 180 days before the date scheduled for initial fuel load set forth in the notification submitted in accordance with 10 CFR § 52.103(a), DTE Electric Company shall revise the Fermi 3 Emergency Plan to include the following: • Incorporation of corrective actions identified in the staffing assessments described above. Identification of how the augmented staff will be notified given degraded communications capabilities.

A.2 Inspections, Tests, Analyses, and Acceptance Criteria

The staff has identified the certain inspections, tests, analyses, and acceptance criteria (ITAAC) that it will recommend the Commission impose with respect to a COL issued to the applicant. The COL application ITAAC consists of the following four parts:

1. Design Certification ITAAC
2. Physical Security ITAAC
3. Emergency Planning ITAAC
4. Site-specific ITAAC

1. Design Certification ITAAC

The design certification ITAAC are in the ESBWR DCD, Revision 10, Tier 1, which will be incorporated by reference into the COL should a COL be issued to the applicant.

2. Physical Security ITAAC

The physical security ITAAC are provided in Table 2-1. The licensee shall perform and satisfy the ITAAC defined in Table 2-1 (from Fermi 3 SER Table 13.6-1 and Fermi 3 COL Application Part 10, Table 2.2-1).

Table 2-1
ITAAC for the Site-Specific Security System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1(a). Vital equipment will be located only within a vital area.	1(a). All vital equipment locations will be inspected.	1(a). Vital equipment is located only within a vital area.
1(b). Access to vital equipment will require passage through at least two physical barriers.	1(b). All vital equipment physical barriers will be inspected.	1(b). Vital equipment is located within a protected area such that access to the vital equipment requires passage through at least two physical barriers.
2(a). Physical barriers for the protected area perimeter will not be part of vital area barriers.	2(a). The protected area perimeter barriers will be inspected.	2(a). Physical barriers at the perimeter of the protected area are separated from any other barrier designated as a vital area barrier.
2(b). Penetrations through the protected area barrier will be secured and monitored.	2(b). All penetrations through the protected area barrier will be inspected.	2(b). All penetrations and openings through the protected area barrier are secured and monitored by intrusion detection equipment.
2(c). Unattended openings that intersect a security boundary, such as underground pathways, will be protected by a physical barrier and monitored by intrusion detection equipment or provided surveillance at a frequency sufficient to detect exploitation.	2(c). All unattended openings within the protected area barriers will be inspected.	2(c). All unattended openings (such as underground pathways) that intersect a security boundary (such as the protected area barrier), are protected by a physical barrier and monitored by intrusion detection equipment or provided surveillance at a frequency sufficient to detect exploitation.

Table 2-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
3(a). Isolation zones will exist in outdoor areas adjacent to the physical barrier at the perimeter of the protected area and will be designed of sufficient size to permit observation and assessment on either side of the barrier.	3(a). The isolation zones in outdoor areas adjacent to the protected area perimeter barrier will be inspected.	3(a). The isolation zones exist in outdoor areas adjacent to the physical barrier at the perimeter of the protected area and are of sufficient size to permit observation and assessment of activities on either side of the barrier in the event of its penetration or attempted penetration.
3(b). Isolation zones will be monitored with intrusion detection and assessment equipment that is designed to provide detection and assessment of activities within the isolation zone.	3(b). The intrusion detection equipment within the isolation zones will be inspected.	3(b). Isolation zones are equipped with intrusion detection and assessment equipment capable of providing detection and assessment of activities within the isolation zone.
3(c). Areas where permanent buildings do not allow sufficient observation distance between the intrusion detection system and the protected area barrier (e.g., the building walls are immediately adjacent to, or are an integral part of the protected area barrier) will be monitored with intrusion detection and assessment equipment that is designed to detect the attempted or actual penetration of the protected area perimeter barrier before completed penetration of the barrier and assessment of detected activities.	3(c). Inspections of areas of the protected area perimeter barrier that do not have isolation zones will be performed.	3(c). Areas where permanent buildings do not allow sufficient observation distance between the intrusion detection system and the protected area barrier (e.g., the building walls are immediately adjacent to, or an integral part of, the protected area barrier) are monitored with intrusion detection and assessment equipment that detects attempted or actual penetration of the protected area perimeter barrier before completed penetration of the barrier and assessment of detected activities.
4(a). The perimeter intrusion detection system will be designed to detect penetration or attempted penetration of the protected area perimeter barrier before completed penetration of the barrier, and for subsequent alarms to annunciate concurrently in at least two continuously manned onsite alarm stations (central and secondary alarm stations).	4(a). Tests, inspections, or a combination of tests and inspections of the intrusion detection system will be performed.	4(a). The intrusion detection system can detect penetration or attempted penetration of the protected area perimeter barrier before completed penetration of the barrier, and subsequent alarms annunciate concurrently in at least two continuously manned on site alarms stations (central and secondary alarm stations).
4(b). The perimeter assessment equipment will be designed to provide video	4(b). Tests, inspections, or a combination of tests and inspections of the video	4(b). The perimeter assessment equipment is capable of real-time and playback video image

Table 2-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
image recording with real-time and playback capability that can provide assessment of detected activities before and after each alarm annunciation at the protected area perimeter barrier.	assessment equipment will be performed.	recording that provides assessment of detected activities before and after each alarm at the protected area perimeter barrier.
4(c). The intrusion detection and assessment equipment at the protected area perimeter will be designed to remain operable from an uninterruptible power supply in the event of the loss of normal power.	4(c). Tests, inspections, or a combination of tests and inspections of the uninterruptible power supply will be performed.	4(c). All Intrusion detection and assessment equipment at the protected area perimeter remains operable from an uninterruptible power supply in the event of the loss of normal power.
5. Isolation zones and exterior areas within the protected area will be provided with illumination to permit assessment in the isolation zones and observation of activities within exterior areas of the protected area.	5. The illumination in isolation zones and exterior areas within the protected area will be inspected.	5. Illumination in isolation zones and exterior areas within the protected area is 0.2 foot candles measured horizontally at ground level or alternatively augmented, sufficient to permit assessment and observation.
6. The external walls, doors, ceiling, and floors in the Secondary Alarm Station, and the last access control function for access to the protected area will be bullet resistant, to at least Underwriters Laboratories Ballistic Standard 752, “The Standard of Safety for Bullet-Resisting Equipment,” Level 4, or National Institute of Justice Standard 0108.01, “Ballistic Resistant Protective Materials,” Type III.	6. Type test, analysis, or a combination of type test and analysis of the external walls, doors, ceiling, and floors in the Secondary Alarm Station, and the last access control function for access to the protected area will be performed.	6. A report exists and concludes that the walls, doors, ceilings, and floors in the Secondary Alarm Station, and the last access control function for access to the protected area are bullet resistant to at least Underwriters Laboratories Ballistic Standard 752, Level 4, or National Institute of Justice Standard 0108.01, Type III.
7. The vehicle barrier system will be designed, installed, and located at the necessary standoff distance to protect against the design-basis threat vehicle bombs.	7. Type test, inspections, analysis or a combination of type tests, inspections, and analysis will be performed for the vehicle barrier system.	7. A report exists and concludes that the vehicle barrier system will protect against the threat vehicle bombs based on the standoff distance for the system.
8(a). Access control points will be established and designed to control personnel and vehicle access into the protected area.	8(a). Tests, inspections, or a combination of tests and inspections of installed systems and equipment will be performed.	8(a). Access control points exist for the protected area and are configured to control access.
8(b). Access control points will be established and designed	8(b). Tests, inspections, or a combination of tests and	8(b). Detection equipment exists and is capable of detecting

Table 2-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
with equipment for the detection of firearms, explosives, and incendiary devices at the protected area personnel access points.	inspections of installed systems and equipment will be performed.	firearms, explosives, and incendiary devices at the protected area personnel access control points.
9. An access control system with a numbered photo identification badge system will be installed and designed for use by individuals who are authorized access to protected areas and vital areas without escort.	9. The access control system and the numbered photo identification badge system will be tested.	9. The access authorization system with a numbered photo identification badge system is installed and provides authorized access to protected and vital areas only to those individuals with unescorted access authorization.
10. Unoccupied vital areas will be designed with locking devices and intrusion detection devices that annunciate in the Secondary Alarm Station.	10. Tests, inspections, or a combination of tests and inspections of unoccupied vital area intrusion detection equipment and locking devices will be performed.	10. Unoccupied vital areas are locked, and intrusion is detected and annunciated in the Secondary Alarm Station.
11(a). Intrusion detection equipment and video assessment equipment will annunciate and be displayed concurrently in at least two continuously manned onsite alarm stations (Central and Secondary Alarm Stations).	11(a). Tests, inspections, or a combination of tests and inspections of intrusion detection equipment and video assessment equipment will be performed.	11(a). Intrusion detection equipment and video assessment equipment annunciate and display concurrently in at least two continuously manned onsite alarm stations (Central and Secondary Alarm Stations).
11(b). The Secondary Alarm Station will be located inside the protected area and will be designed so that the interior of the alarm station is not visible from the perimeter of the protected area.	11(b). The Secondary Alarm Station location will be inspected.	11(b). The Secondary Alarm Station is located inside the protected area, and the interior of the alarm station is not visible from the perimeter of the protected area.
11(c). Central and Secondary Alarm Stations will be designed, equipped and constructed such that no single act, in accordance with the design-basis threat of radiological sabotage, can simultaneously remove the ability of both the central and secondary alarm stations to (1) detect and assess alarms, (2) initiate and coordinate an adequate response to alarms, (3) summon offsite assistance, and (4) provide effective command and control.	11(c). Tests, inspections, or a combination of tests and inspections of the Central and Secondary Alarm Stations will be performed.	11(c). Central and Secondary Alarm Stations are designed, equipped, and constructed such that no single act, in accordance with the design-basis threat of radiological sabotage, can simultaneously remove the ability of both the central and secondary alarm stations to (1) detect and assess alarms, (2) initiate and coordinate an adequate response to alarms, (3) summon offsite assistance, and (4) provide effective command and control.

Table 2-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
11(d). Both the Central and Secondary Alarm Stations will be constructed, located, protected, and equipped to the standards for the Central Alarm Station (alarm stations need not be identical in design but shall be equal and redundant, capable of performing all functions required of alarm stations).	11(d). Tests, inspections, or a combination of tests and inspections of the Central and Secondary Alarm Stations will be performed.	11(d). The Central and Secondary Alarm Stations are located, constructed, protected, and equipped to the standards of the Central Alarm Station and are functionally redundant (stations need not be identical in design).
12. The secondary security power supply system for alarm annunciator equipment contained in the Secondary Alarm Station and non-portable communications equipment contained in the Secondary Alarm Station is located within a vital area.	12. The secondary security power supply system will be inspected.	12. The secondary security power supply system for alarm annunciator equipment contained in the Secondary Alarm Station and non-portable communications equipment contained in the Secondary Alarm Station is located within a vital area.
13(a). Security alarm devices, including transmission lines to annunciators, will be tamper-indicating and self-checking (e.g., an automatic indication is provided when failure of the alarm system or a component occurs or when on standby power), and alarm annunciation indicates the type of alarm (e.g., intrusion alarms, emergency exit alarm) and location.	13(a). All security alarm devices and transmission lines will be tested.	13(a). Security alarm devices including transmission lines to annunciators are tamper-indicating and self-checking (e.g., an automatic indication is provided when failure of the alarm system or a component occurs, or when the system is on standby power), and the alarm annunciation indicates the type of alarm (e.g., intrusion alarm, emergency exit alarm) and location.
13(b). Intrusion detection and assessment systems will be designed to provide visual display and audible annunciation of alarms in the Secondary Alarm Station.	13(b). Intrusion detection and assessment systems will be tested.	13(b). The intrusion detection and assessment systems provide a visual display and audible annunciation of alarms in the Secondary Alarm Station (concurrently with the display and annunciation in the Central Alarm Station).
14. No Site-Specific ITAAC specified.	14. No Site-Specific ITAAC specified.	14. No Site-Specific ITAAC specified.
15. Emergency exits through the protected area perimeter and vital area boundaries will be alarmed with intrusion detection devices and secured by locking devices that allow prompt egress during an emergency.	15. Tests, inspections, or a combination of tests and inspections of emergency exits through the protected area perimeter and vital area boundaries will be performed.	15. Emergency exits through the protected area perimeter and vital area boundaries are alarmed with intrusion detection devices and secured by locking devices that allow prompt egress during an emergency.

Table 2-1 ITAAC for the Site-Specific Security System		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
16(a). The Secondary Alarm Station will have conventional (land line) telephone service with the Main Control Room and local law enforcement authorities.	16(a). Tests, inspections, or a combination of tests and inspections of the Secondary Alarm Stations' conventional (land line) telephone service will be performed.	16(a). The Secondary Alarm Station is equipped with conventional (land line) telephone service with the Main Control Room and local law enforcement authorities.
16(b). The Secondary Alarm Station will be capable of continuous communication with on-duty security force personnel.	16(b). Tests, inspections, or a combination of tests and inspections of the Secondary Alarm Stations' continuous communication capabilities will be performed.	16(b). The Secondary Alarm Station is capable of continuous communication with on-duty watchmen, armed security officers, armed responders, or other security personnel who have responsibilities within the physical protection program and during contingency response events.
16(c). Non-portable communications equipment in the Secondary Alarm Station will remain operable from an independent power source in the event of loss of normal power.	16(c). Tests, inspections, or a combination of tests and inspections of the non-portable communications equipment will be performed.	l6(c). All non-portable communication devices (including conventional telephone systems) in the Secondary Alarm Station are wired to an independent power supply that enables those systems to remain operable (without disruption) during the loss of normal power.

3. Emergency Planning ITAAC.

The emergency planning (EP)-ITAAC are provided in Table 3-1. The licensee shall perform and satisfy the ITAAC defined in Table 3.-1 (from Fermi 3 COL Application Part 10, Table 2.3-1)

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
1.0 Assignment of Responsibility – Organizational Control			
10 CFR 50.47(b)(1) – Primary responsibilities for emergency response by the nuclear facility licensee, and by State and local organizations within the emergency planning zones (EPZs) have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principle response organization has staff to respond and to augment its initial response on a continuous basis.	1.1 The staff exists to provide 24-hour per day emergency response and manning of communications links, including continuous operations for a protracted period. [A.1.e, A.4**] [**A.1.e, A.4 corresponds to NUREG-0654/FEMA-REP-1 evaluation criteria.] ITAAC Element addressed in: COL EP II.A.1.b, II.A.1.e	1.1 An inspection of the implementing procedures or staffing rosters will be performed.	1.1 Emergency plan implementing procedures or staffing rosters establish 24-hour per day emergency response staffing and manning of communications links, including continuous operations for a protracted period.
2.0 Onsite Emergency Organization			
10 CFR 50.47(b)(2) – On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available, and the interfaces among various onsite response activities and offsite support and response activities are specified.	2.1 The staff exists to provide minimum and augmented on-shift staffing levels, consistent with Table B-1 of NUREG-0654/FEMA-REP-1, Revision 1. [B.5, B.7] ITAAC Element addressed in: COL EP II.B.3, II.B.4, II.B.6, Table II.B-1	2.1 An inspection of the implementing procedures or staffing rosters will be performed.	2.1 Emergency plan implementing procedures or staffing rosters establish minimum and augmented on-shift staffing levels, consistent with Table II.B-1 of the Fermi 3 Combined License Application Emergency Plan.
3.0 Emergency Response Support and Resources			
10 CFR 50.47(b)(3) – Arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee's near-site Emergency Operations Facility (EOF) have been made, and other organizations capable of augmenting the planned response	Not used. Provided for consistency with Regulatory Guide (RG), 1.206 Table C.II.1-B1 "Emergency Planning— Generic Inspection, Test, Analysis, and Acceptance Criteria (EP-ITAAC)," ITAAC numbering scheme.	Not used. Provided for consistency with RG 1.206, Table C.II.1-B1 Emergency Planning— Generic Inspection, Test, Analysis, and Acceptance Criteria (EP-ITAAC)," ITAAC numbering scheme.	Not used. Provided for consistency with RG 1.206, Table C.II.1-B1 Emergency Planning—Generic Inspection, Test, Analysis, and Acceptance Criteria (EP-ITAAC)," ITAAC numbering scheme.

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
have been identified.			
4.0 Emergency Classification System			
10 CFR 50.47(b)(4) – A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.	4.1 A standard emergency classification and emergency action level (EAL) scheme exists, and identifies facility system and effluent parameters constituting the bases for the classification scheme. [D.1] ITAAC Element addressed in: COL EP II.D.1	4.1 An inspection of the control room, technical support center (TSC), and EOF will be performed to verify that they have displays for retrieving facility system and effluent parameters that constitute the bases for the classification scheme in emergency plan Implementing Procedure, "Emergency Classification."	4.1.1 The specific parameters identified in the EAL thresholds included in emergency plan implementing procedure, "Emergency Classification," have been retrieved and displayed in the control room, TSC, and EOF. 4.1.2 The ranges available in the control room, TSC, and EOF encompasses the values for the specific parameters identified in the EAL thresholds included in emergency plan implementing procedure, "Emergency Classification."
5.0 Notification Methods and Procedures			
10 CFR 50.47(b)(5) – Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established.	5.1 The means exist to notify responsible State and local organizations within 15 minutes, after the licensee declares an emergency. [E.1] ITAAC Element addressed in: COL EP II.E.1	5.1 A test will be performed of the capabilities.	5.1 Communications have been established via Ringdown Phone System among the control room, the State of Michigan, Monroe County, and Wayne County within 15 minutes after an emergency has been declared.
	5.2 The means exist to notify emergency response personnel. [E.2] ITAAC Element addressed in: COL EP II.E.1	5.2 A test will be performed of the capabilities.	5.2 Notification to the Fermi 3 emergency response organization has been performed. NOTE: Confirmation of the ability to alert, notify and mobilize the Fermi 3 emergency response personnel is addressed in Acceptance Criterion 14.1.1.B.1.

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
	5.3 The means exists to notify and provide instructions to the populace within the plume exposure EPZ. [E.6] ITAAC Element addressed in: COL EP II.E.2 & E.5	5.3 See 5.3 Acceptance Criteria.	5.3 The capability of the Alert and Notification System (A&NS) to operate properly is tested monthly by the Fermi 2 Reactor Oversight Program and may be presumed adequate for the purposes of the Fermi 3 EP as identified in NRC RAI Letter 52, ML110590635 (RAI 13.03-57).
6.0 Emergency Communications			
10 CFR 50.47(b)(6) – Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public.	6.1 The means exist for communications among the control room, TSC, EOF, principal State, and local, emergency operations centers (EOCs), and radiological emergency teams. [F.1.d] ITAAC Element addressed in: COL EP II.F.1.A & B	6.1 A test will be performed of the capabilities.	6.1.1 Communications via the Ringdown Phone System have been established among the control room, TSC, EOF, State of Michigan, Monroe County, Wayne County, and the Province of Ontario, Canada. 6.1.2 Communications have been established between the TSC and radiological emergency teams. 6.1.3 Communications have been established between the EOF and radiological emergency teams.
	6.2 The means exist for communications from the control room, TSC, and EOF to the NRC headquarters and regional office EOCs (including establishment of the Emergency Response Data Systems (ERDS) between the onsite computer system and the NRC Operations Center.) [F.1.f] ITAAC Element addressed in: COL EP II.F.1.A.5	6.2 A test will be performed of the capabilities.	6.2 Communications have been established from the control room, TSC, and EOF to NRC Headquarters and Region III EOCs, and an access port for ERDS is provided.

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
7.0 Public Education and Information			
10 CFR 50.47(b)(7) – Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors), the principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) are established in advance, and procedures for coordinated dissemination of information to the public are established.	7.1 The licensee has provided space which may be used for a limited number of the news media at the near-site EOF [G.3.b] ITAAC Element addressed in: COL EP II.G.3 & 4	7.1 An inspection of the Joint Information Center will be performed to verify that space is provided for a limited number of the news media.	7.1 The Joint Information Center has space for approximately 500 news media personnel.
8.0 Emergency Facilities and Equipment			
10 CFR 50.47(b)(8) – Adequate emergency facilities and equipment to support the emergency response are provided and maintained.	8.1 The licensee has established a TSC and onsite operations support center (OSC). [H.1] ITAAC Element addressed in: COL EP II.H.1.b & c	8.1.1 An inspection of the as-built TSC and OSC will be performed.	8.1.1 The TSC has at least 182 square meters (1950 square feet) of floor space. 8.1.2 The following communications equipment has been provided in the TSC and voice transmission and reception have been accomplished: • NRC systems: Emergency Notification System (ENS), Health Physics Network (HPN), Reactor Safety Counterpart Link (RSCL), Protective Measures Counterpart Link (PMCL), Management Counterpart Link (MCL) • Dedicated telephone to EOF • Dedicated telephone to control room • Dedicated telephone to OSC 8.1.3 The TSC has been located in the Electrical Building. 8.1.4 The TSC includes radiation monitors

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			and a ventilation system with a high efficiency particulate air (HEPA) and charcoal filter. 8.1.5 A back-up electrical power supply is available for the TSC. 8.1.6 Reception, storage, processing, and display of plant and environmental information used to initiate emergency measures and conduct emergency assessment has been accomplished at the TSC. 8.1.7 The OSC is in a location separate from the control room. 8.1.8 The following communications equipment has been provided in the OSC and voice transmission and reception have been accomplished: • Dedicated telephone to control room • Dedicated telephone to TSC • Plant page system (voice transmission only)
	8.2 The licensee has established an emergency operations facility (EOF). [H.2] ITAAC Element addressed in: COL EP II.H.1.d	8.2 An inspection of the EOF will be performed.	8.2.1 A report exists that confirms the EOF is greater than 300 square meters (3,225 square feet). 8.2.2 The EOF includes shielding with a protection factor of 20. 8.2.3 The EOF HVAC system includes the capability to isolate and filter outside air with HEPA filters. 8.2.4 The EOF includes portable airborne radioactivity and area radiation monitors with local alarm capability. 8.2.5 Voice transmission and reception have been accomplished between the EOF and TSC. 8.2.6 Voice transmission and reception have

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			been accomplished between the EOF, the control room, TSC, and the following organizations: NRC, the State of Michigan, Monroe County, and Wayne County. 8.2.7 Acquisition, display and evaluation of radiological, meteorological, and plant system data specified in emergency plan implementing procedure, "Dose Assessment Methodology," needed to determine offsite protective action recommendations has been accomplished at the EOF.
	8.3 The means exists to initiate emergency measures, consistent with Appendix 1 of NUREG-0654/FEMA-REP-1, Revision 1. [H.5] ITAAC Element addressed in: COL EP II.H.4	8.3 An analysis of emergency plan implementing procedures will be performed.	8.3 The means to initiate emergency measures, described in Section II.H.4 of the Fermi 3 Combined License Application Emergency Plan are addressed in emergency plan implementing procedures, "Emergency Classification."
	8.4 The means exists to acquire data from, or for emergency access to, offsite monitoring and analysis equipment. [H.6] ITAAC Element addressed in: COL II. C.3, II.H.1.d, II.H.4.a, II.H.4.b. II.H.5.b	8.4 An analysis of emergency plan implementing procedures will be performed.	8.4 The means to acquire data from, or for emergency access to, offsite monitoring and analysis equipment described in Sections II.C.3, II.H.1.d, II.H.4.a, II.H.4.b, and II.H.5.b of the Fermi 3 Combined License Application Emergency Plan are addressed in emergency plan implementing procedures, "Dose Assessment Methodology."
	8.5 The means exists to provide offsite radiological monitoring equipment in the vicinity of the nuclear facility. [H.7] ITAAC Element addressed in: COL II.H.2 & II.H.6	8.5 An analysis of emergency plan implementing procedures will be performed.	8.5 The means to provide for offsite radiological monitoring equipment in the vicinity of Fermi 3 described in Sections II.H.2 and II.H.6 of the Fermi 3 Combined License Application Emergency Plan are addressed in emergency plan implementing procedures, "Onsite/Offsite Radiological Monitoring."
	8.6 The means exists to	8.6 An analysis of emergency plan	8.6 The means to obtain meteorological

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
	provide meteorological information, consistent with Appendix 2 of NUREG-0654/FEMA-REP-1, Revision 1.[H.8] ITAAC Element addressed in: COL II.H.7	implementing procedures will be performed.	information described in Section II.H.7 of the Fermi 3 Combined License Application Emergency Plan are addressed in emergency plan implementing procedures, "Dose Assessment Methodology."
9.0 Accident Assessment			
10 CFR 50.47(b)(9) – Adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use.	9.1 The means exist to provide initial and continuing radiological assessment throughout the course of an accident. [I.2] ITAAC Element addressed in: COL EP II.I.2, Appendix 4	9.1 A test of the emergency plan will be conducted by performing an exercise or drill to verify the capability to perform accident assessment.	9.1 Using selected monitoring parameters identified in the EAL thresholds included in emergency plan implementing procedure, "Emergency Classification," simulated degraded plant conditions are assessed and protective actions are initiated in accordance with the following criteria: A. Accident Assessment and Classification 1. Demonstrate the ability to identify initiating conditions, determine EAL parameters, and correctly classify the emergency throughout the exercise or drill. B. Radiological Assessment and Control 1. Demonstrate the ability to obtain onsite radiological surveys and samples. 2. Demonstrate the ability to continuously monitor and control radiation exposure to emergency workers. 3. Demonstrate the ability to assemble

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			and deploy field monitoring teams within 60 minutes from the decision to do so. 4. Demonstrate the ability to satisfactorily collect and disseminate field team data. 5. Demonstrate the ability to develop dose projections. 6. Demonstrate the ability to make the decision whether to issue radioprotective drugs (KI) to Fermi 3 emergency workers. 7. Demonstrate the ability to develop appropriate protective action recommendations (PARs) and communicated to appropriate authorities within 15 minutes of development
	9.2 The means exists to determine the source term of releases of radioactive material within plant systems, and the magnitude of the release of radioactive materials based on plant system parameters and effluent monitors. [I.3] ITAAC Element addressed in: COL EP II.I.3, Appendix 4	9.2 An analysis of emergency plan implementing procedures and the Offsite Dose Calculation Manual (ODCM) will be completed to verify the ability to determine the source term and magnitude of release.	9.2 Emergency plan implementing procedure, “Dose Assessment Methodology,” and the ODCM correctly calculate source terms and magnitudes of postulated releases.
	9.3 The means exists to continuously assess the impact of the release of radioactive	9.3 An analysis of emergency plan implementing procedures and the ODCM will be completed to verify the	9.3 Emergency plan implementing procedure, “Dose Assessment Methodology,” and the ODCM calculate the

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
	materials to the environment, accounting for the relationship between effluent monitor readings, and onsite and offsite exposures and contamination for various meteorological conditions. [I.4] ITAAC Element addressed in: COL EP II.I.4, Appendix 4	relationship between effluent monitor readings and offsite exposures and contamination for various meteorological conditions has been established.	relationship between effluent monitor readings and offsite exposures and contamination for various meteorological conditions.
	9.4 The means exists to acquire and evaluate meteorological information. [I.5] ITAAC Element addressed in: COL EP II.I.5	9.4 An inspection of the control room, TSC, and EOF will be performed to verify the availability of the following meteorological data is available: • Wind speed (at 10 m and 60 m) • Wind direction (at 10 m and 60 m) • Ambient air temperature (at 10 m and 60 m)	9.4.1 The specified meteorological data was available at the control room, TSC, and EOF. 9.4.2 The specified meteorological data was transmitted to and received by the offsite NRC center and State of Michigan.
	9.5 The means exists to determine the release rate and projected doses if the instrumentation used for assessment is off-scale or inoperable. [I.6]	9.5 An analysis of the methodology contained in the emergency plan implementing procedures for determining the release rate and projected dose when the instrumentation used for assessment is offscale or inoperable will be performed.	9.5 Emergency plan implementing procedure, “Dose Assessment Methodology,” provides the means to determine the release rate and projected doses if the instrumentation used for assessment is off-scale or inoperable.
	9.6 The means exist for field monitoring within the plume exposure EPZ. [I.7]	9.6 An analysis of emergency plan implementing procedures will be performed.	9.6 Emergency plan implementing procedure, “Onsite/Offsite Radiological Monitoring,” provides the means for field monitoring within the plume exposure pathway EPZ.
	9.7 The means exist to make rapid assessments of actual or potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways, including activation, notification	9.7 A test will be performed of the capabilities.	9.7 Demonstrate the capability for making rapid assessment of the actual or potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways.

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
	means, field team composition, transportation, communication, monitoring equipment, and estimated deployment times. [I.8] ITAAC Element addressed in: COL EP II.I.7		
	9.8 The capability exists to detect and measure radioiodine concentrations in air in the plume exposure EPZ, as low as 10^{-7} µCi/cc (microcuries per cubic centimeter) under field conditions. [I.9] ITAAC Element addressed in: COL EP II.I.8	9.8 A test of Fermi 3 field survey instrumentation will be performed to verify the capability to detect airborne concentrations as low as 10^{-7} µCi/cc.	9.8 Instrumentation used for monitoring I-131 to detect airborne concentrations as low as 10^{-7} µCi/cc has been provided.
	9.9 The means exist to estimate integrated dose from the projected and actual dose rates, and for comparing these estimates with the EPA protective action guides (PAGs). [I.10] ITAAC Element addressed in: COL EP II.I.9, Appendix 4	9.9 An analysis of the methodology contained in the emergency plan implementing procedures for estimating dose and preparing protective action recommendations, and in the ODCM, will be performed to verify the ability to estimate an integrated dose from projected and actual dose rates.	9.9 Emergency plan implementing procedure, "Dose Assessment Methodology," and the ODCM estimate an integrated dose.
10.0 Protective Response			
10 CFR 50.47(b)(10) – A range of protective actions has been developed for the plume exposure EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a supplement to these, the prophylactic	10.1 The means exist to warn and advise onsite individuals of an emergency, including those in areas controlled by the operator, including:[J.1] 1. employees not having emergency assignments;	10.1 A test of the onsite warning and communications capability emergency plan implementing procedures including protective action guidelines, assembly and accountability and site dismissal will be performed during a drill or exercise.	10.1.1 Demonstrate the capability to direct and control emergency operations. 10.1.2 Demonstrate the ability to transfer emergency direction from the control room (simulator) to the TSC within 30 minutes from activation. 10.1.3 Demonstrate the ability to prepare

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
use of potassium iodide (KI), as appropriate. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure EPZ appropriate to the locale have been developed.	2. visitors; 3. contractor and construction personnel; and 4. other persons who may be in the public access areas, on or passing through the site, or within the owner controlled area. ITAAC Element addressed in: COL EP II.J.1.		for 24-hour staffing requirements. 10.1.4 Demonstrate the ability to perform assembly and accountability for all onsite individuals within 30 minutes of an emergency requiring protected area assembly and accountability. 10.1.5 Demonstrate the ability to perform site dismissal. 10.1.6 Demonstrate the ability to provide warnings and instructions to individuals outside the protected area, but within the Owner Controlled Area.
	10.2 The means exist to radiological monitor people evacuated from the site. [J.3]	10.2 A test of the emergency plan implementing procedures will be performed.	10.2 Demonstrate the ability to perform radiological monitoring of people evacuated from the site during a drill or exercise.
	10.3 The means exists to notify and protect all segments of the transient and resident population. [J.10]	10.3 An analysis of offsite emergency plans will be performed.	10.3 State and local plans or procedures provide methods to notify and protect all segments of the transient and resident population.
11.0 Radiological Exposure Control			
10 CFR 50.47(b)(11) – Means for controlling radiological exposures, in an emergency, are established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity PAGs.	11.1 The means exists to provide onsite radiation protection. [K.2]	11.1 A test will be performed of the capabilities.	11.1 Note: Demonstration of the ability to provide onsite radiation protection during an emergency is addressed in Acceptance Criteria 9.1.B.1 and 9.1.B.2 and under exercise/drill objectives and Performance Criteria identified in Acceptance Criteria 14.1.1.E.1 and 14.1.1.E.2.
	11.2 The means exists to provide 24-hour-per-day capability to determine the doses received by emergency personnel and maintain dose records. [K.3]	11.2 A test will be performed of the capabilities.	11.2 Note: Demonstration of the ability to determine the doses received by Detroit Edison emergency workers and to maintain dose records continuously during an emergency is addressed in Acceptance Criterion 9.1.B.2 and under exercise/drill objectives and Performance Criteria

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			identified in Acceptance Criterion 14.1.1.E.2.
	11.3 The means exists to decontaminate relocated onsite and emergency personnel, including waste disposal. [K.5.b, K.7]	11.3 A test will be performed of the capabilities.	11.3 Demonstrate the ability to decontaminate relocated onsite and Detroit Edison emergency workers, including waste disposal, during a drill or exercise.
	11.4 The means exists to provide onsite contamination control measures. [K.6]	11.4 A test will be performed of the capabilities.	11.4 Demonstrate the ability to perform onsite contamination control measures during a drill or exercise.
12.0 Medical and Public Health Support			
10 CFR 50.47(b)(12) – Arrangements are made for medical services for contaminated, injured individuals.	12.1 Arrangements have been implemented for local and backup hospital and medical services having the capability for evaluation of radiation exposure and uptake. [L.1]	12.1 An analysis of letters of agreement will be performed.	12.1 Arrangements have been implemented with Mercy Memorial Hospital in Monroe Michigan, and Oakwood Southshore Medical Center in Trenton, Michigan, for evaluation of radiation exposure and uptake.
	12.2 The means exists for onsite first aid capability. [L.2]	12.2 A test will be performed of the capabilities.	12.2 Demonstrate the ability to provide onsite first aid during an emergency.
	12.3 Arrangements have been implemented for transporting victims of radiological accidents, including contaminated injured individuals, from the site to offsite medical support facilities. [L.4]	12.3 An analysis of letters of agreement will be performed.	12.3 Arrangements have been implemented for transporting victims of radiological accidents, including contaminated injured individuals, from the site to offsite medical support facilities.
13.0 Recovery and Reentry Planning and Post-Accident Operations			
10 CFR 50.47(b)(13) – General plans for recovery and reentry are developed.	Not used. Provided for consistency with RG 1.206, Table C.II.1-B1, "Emergency Planning—Generic Inspection, Test, Analysis, and Acceptance Criteria (EP-ITAAC)," ITAAC numbering scheme.	Not used. Provided for consistency with RG 1.206, Table C.II.1-B1, "Emergency Planning—Generic Inspection, Test, Analysis, and Acceptance Criteria (EP-ITAAC)," ITAAC numbering scheme.	Not used. Provided for consistency with RG 1.206, Table C.II.1-B1, "Emergency Planning—Generic Inspection, Test, Analysis, and Acceptance Criteria (EP-ITAAC)," ITAAC numbering scheme.

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
14.0 Exercises and Drills			
10 CFR 50.47(b)(14) – Periodic exercises are (will be) conducted to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected.	14.1 Licensee conducts a full participation exercise to evaluate major portions of emergency response capabilities, which includes participation by each State, local and provincial agency within the plume exposure EPZ, and each State and provincial agency within the ingestion exposure EPZ. [N.1] ITAAC Element addressed in: COL EP II.N.1.	14.1 A full participation exercise (test) will be conducted within the specified time periods of Appendix E to 10 CFR Part 50.	14.1.1 The exercise is completed within the specified time periods of Appendix E to 10 CFR Part 50, onsite exercise objectives listed below have been met, and there are no uncorrected onsite exercise deficiencies. *A. Accident Assessment and Classification* 1. Demonstrate the ability to identify initiating conditions, determine emergency action level (EAL) parameters, and correctly classify the emergency throughout the exercise. Performance Criterion: a. Determine the correct highest emergency classification level based on events which were in progress, considering past events and their impact on the current conditions, within 15 minutes of indications for an emergency event. *B. Notification* 1. Demonstrate the ability to alert, notify and mobilize site emergency response personnel. Performance Criteria: a. Complete the designated actions in accordance with emergency plan implementing procedures and perform the announcement within 15 minutes of the initial event classification for an Alert or higher b. Mobilize site emergency responders in accordance with emergency plan implementing procedures within 15 minutes of the initial event classification for an Alert or higher. 2. Demonstrate the ability to notify responsible State and local government

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			agencies within 15 minutes and the NRC within 60 minutes after declaring an emergency. Performance Criteria: a. Transmit information in accordance with approved emergency plan implementing procedures beginning within 15 minutes after event classification. b. Transmit information in accordance with approved emergency plan implementing procedures, beginning within 60 minutes after last transmittal for a follow-up notification to State and local authorities. c. Transmit information in accordance with emergency plan implementing procedures immediately following state and local notification and within 60 minutes of event classification for an initial notification of the NRC. 3. Demonstrate the ability to warn or advise onsite individuals of emergency conditions. Performance Criteria: a. Initiate notification of onsite individuals within 15 minutes of notification.1. *C. Emergency Response* 1. Demonstrate the capability to direct and control emergency operations. Performance Criterion: a. Command and control is demonstrated by the control room in the early phase of the emergency, and the technical support center (TSC) within 60 minutes of declaration of an Alert or higher emergency classification. 2. Demonstrate the ability to transfer emergency direction from the control room

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			(simulator) to the TSC upon activation. Performance Criteria: a. Turnover briefings are conducted in accordance with emergency plan implementing procedures. b. Documentation of transfer of duties is completed in accordance with emergency plan implementing procedures. 3. Demonstrate the ability to prepare for 24-hour staffing requirements. Performance Criterion: a. Complete 24-hour staff assignments. 4. Demonstrate the ability to perform assembly and accountability for all onsite individuals within 30 minutes of an emergency requiring protected area assembly and accountability. Performance Criterion: a. Protected area (PA) personnel assembly and accountability completed within 30 minutes of an emergency requiring PA assembly and accountability. *D. Emergency Response Facilities* 1. Demonstrate activation of the operational support center (OSC), and full functional operation of the TSC and EOF within 60 minutes declaration of Alert or higher emergency classification. Performance Criterion: a. The TSC, EOF and OSC are activated within about 60 minutes of the initial notification. 2. Demonstrate the adequacy of equipment, security provisions, and habitability precautions for the TSC, OSC and EOF as appropriate. Performance Criteria: a. Emergency equipment in the

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			emergency response facilities as specified in emergency plan implementing procedures was available to emergency responders. b. The Security Force implements and follows applicable emergency plan implementing procedures. c. he Radiation Protection Coordinator implements designated responsibilities in accordance with emergency plan implementing procedures if an onsite/offsite release has occurred. 3. Demonstrate the adequacy of communications for all emergency support resources. Performance Criteria: a. Emergency response facility personnel are able to operate communication systems in accordance with emergency plan implementing procedures. b. Clear primary and backup communications links are established and maintained for the duration of the exercise. *E. Radiological Assessment and Control* 1. Demonstrate the ability to obtain onsite radiological surveys and samples. Performance Criteria: a. Radiation Protection Technicians demonstrate the ability to obtain appropriate instruments (range and type) and perform surveys. b. Airborne samples are taken in accordance with emergency plan implementing procedures. 2. Demonstrate the ability to continuously monitor and control radiation exposure to emergency workers.

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			Performance Criteria: a. Emergency workers are issued self reading dosimeters when radiation levels require, and exposures are controlled to 10 CFR Part 20 limits (unless the Emergency Director authorizes emergency limits). b. Exposure records are available c. Emergency workers include Security and personnel within all emergency facilities. 3. Demonstrate the ability to assemble and deploy field monitoring teams within 60 minutes from the decision to do so. Performance Criterion: a. One offsite Radiological Emergency Team (RET) is ready to be deployed within 15 - 30 minutes of their arrival. In addition, an offsite monitoring team must be able to be dispatched within 60 minutes of an Alert or higher emergency classification. 4. Demonstrate the ability to collect and disseminate field team data. Performance Criteria: a. RET collects data for dose rate and airborne radioactivity levels in accordance with emergency plan implementing procedures. b. RET communicates data to the TSC and/or EOF in accordance with emergency plan implementing procedures. 5. Demonstrate the ability to develop dose projections. Performance Criterion: a. Timely and accurate dose projections are performed in accordance with emergency plan implementing procedures.

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			6. Demonstrate the ability to make the decision whether to issue radioprotective drugs (KI) to Detroit Edison emergency workers. Performance Criterion: a. KI is taken (simulated) if the estimated dose to the thyroid will exceed 25 rem committed dose equivalent (CDE). 7. Demonstrate the ability to develop appropriate protective action recommendations (PARs) and notify appropriate authorities within 15 minutes of development. Performance Criteria: a. Total effective dose equivalent (TEDE) and CDE dose projections from the dose assessment computer code are compared in accordance with emergency plan implementing procedures. b. PARs are developed within 15 minutes of data availability. c. PAR's are transmitted via voice or fax within 15 minutes of event classification and/or PAR development. *F. Public Information* 1. Demonstrate the capability to develop and disseminate clear, accurate, and timely information to the news media in accordance with emergency plan implementing procedures. Performance Criteria: a. The Joint Information Center (JIC) is activated within 60 minutes following the declaration of a Site Area Emergency or higher classification. b. Follow-up information is provided to the news media, during scheduled news conferences and media

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			briefings. 2. Demonstrate the capability to establish and effectively operate rumor control in a coordinated fashion. Performance Criteria: a. Calls are answered in a timely manner with the correct information, in accordance with emergency plan implementing procedures. b. Calls are returned or forwarded, as appropriate, to demonstrate responsiveness. c. Rumors are identified and addressed in accordance with emergency plan implementing procedures. *G. Evaluation* 1. Demonstrate the ability to conduct a post-exercise critique, to determine areas requiring improvement and corrective action. Performance Criteria: a. An exercise time line is developed, followed by an evaluation of the objectives. b. Significant problems in achieving the objectives are discussed to ensure understanding of why objectives were not fully achieved. c. Recommendations for improvement in non-objective areas are discussed. 14.1.2 Onsite emergency response personnel are mobilized in sufficient number to fill the emergency positions identified in the Fermi 3 Combined License Application Emergency Plan, section II.B, Emergency Response Organization, and they successfully perform their assigned responsibilities as outlined in Acceptance

Table 3-1 ITAAC For Emergency Planning			
Planning Standard	**EP Program Elements**	**Inspections, Tests, Analyses**	**Acceptance Criteria**
			Criterion 14.1.1.D. 14.1.3 The exercise is completed within the specified time periods of Appendix E to 10 CFR Part 50, offsite exercise objectives have been met, and there are either no uncorrected offsite exercise deficiencies or a license condition requires offsite deficiencies to be addressed prior to operation above 5 percent of rated power.
15.0 Radiological Emergency Response Training			
10 CFR 50.47(b)(15) –Radiological emergency response training is provided to those who may be called upon to assist in an emergency.	15.1 Site-specific emergency response training has been provided for those who may be called upon to provide assistance in the event of an emergency. [O.1]	15.1 An inspection of training records will be performed.	15.1 Site-specific emergency response training has been provided for local fire departments, law enforcement, ambulance, and hospital personnel.
16.0 Responsibility for the Planning Effort: Development, Periodic Review, and Distribution of the Plan			
10 CFR 50.47(b)(16) – Responsibilities for plan development and review and for distribution of emergency plans are established, and planners are properly trained.	16.1 The emergency response plans have been forwarded to all organizations and appropriate individuals with responsibility for implementation of the plans. [P.5]	16.1 An inspection of the distribution letter will be performed.	16.1 The Fermi 3 Combined License Application Emergency Plan has been forwarded to the Michigan State Police, Michigan Department of Environmental Quality, Michigan Department of Health, Monroe County Emergency Management, Wayne County Emergency Management and Province of Ontario.
17.0 Implementing Procedures			
10 CFR Part 50, App. E.V – No less than 180 days prior to the scheduled issuance of an operating license for a nuclear power reactor or a license to possess nuclear material, the applicant's detailed implementing procedures for its emergency plan shall be submitted to the Commission.	17.1 The licensee has submitted detailed implementing procedures for its emergency plan no less than 180 days prior to fuel load.	17.1 An inspection of the submittal letter will be performed.	17.1 Detroit Edison has submitted detailed implementing procedures for the onsite emergency plan to the NRC no less than 180 days prior to fuel load.

4. Site-Specific ITAAC

The site-specific ITAAC are provided in Table 4-1 through 4-8.

4.1 ITAAC for Fill Concrete Under Seismic Category I Structure

Compactable backfill will not be placed under Fermi 3 seismic Category I structures. ITAAC for fill concrete placed under seismic Category I structures to a thickness greater than 1.5 meters (5 feet) are provided in Table 4-1. The licensee shall perform and satisfy the ITAAC defined in Table 4-1 (from Fermi 3 COL Application Part 10, Table 2.4.1-1).

Table 4-1
ITAAC for Fill Concrete Under Seismic Category I Structures

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
The foundation grade for the fire water service complex (FWSC) will be established using fill concrete. Fill concrete placed under Seismic Category I Structures to a thickness greater than 5 feet is designed and tested as specified in FSAR Subsection 2.5.4.5.4.2.	Testing will be performed to determine the mean compressive strength for the fill concrete.	A report exists that demonstrates that the mean 28-day compressive strength of the fill concrete is equal to, or greater than, 31 MPa (4,500 psi).

4.2 ITAAC for Backfill Surrounding Seismic Category I Structures

The ITAAC for compacted backfill surrounding the embedded walls for seismic Category I structures is provided in Table 4-2. The licensee shall perform and satisfy the ITAAC defined in Table 4-2 (from Fermi 3 COL Application Part 10, Table 2.4.2-1).

Table 4-2
ITAAC for Backfill Surrounding Seismic Category I Structures

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
1. The engineering properties of backfill material surrounding Seismic Category I structures are equal to or exceed the FSAR Subsection 2.5.4.5.4.2 requirements.	Laboratory tests and field measurements to evaluate the engineering properties of the backfill will be performed. Laboratory testing will include: • Relative density or Proctor tests for density, γ • Direct shear tests for angle of internal friction Field measurements will include: • In-place density tests for density, γ	An engineering report exists that concludes that the engineering properties of backfill material surrounding Seismic Category I structures are equal to or exceed FSAR Subsection 2.5.4.5.4.2 requirements as follows: • Angle of Internal Friction: ≥ 35 degrees • Product of peak ground acceleration, α, (in g), Poisson's ratio, v, and density, γ: α(0.95v+0.65)γ: 1,220 kg/m^3 (76 lbf/ft^3) maximum • Soil Density, γ: 2,000 kg/m^3 (125 lbf/ft^3) minimum

4.3 ITAAC for Plant Service Water System

The site-specific ITTAC for the plant service water system are related to plant service water reserve storage capacity as listed in Table 4-3. The licensee shall perform and satisfy the ITAAC defined in Table 4-3 (from Fermi 3 COL Application Part 10, Table 2.4.3-1).

Table 4-3
ITAAC for Plant Service Water Reserve Storage Capacity

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
1.The volume of water in the PSWS basin shall be sufficient such that:		
a. No active makeup shall be necessary to remove 2.02 x 107 MJ (1.92 x 1010 BTU) over a period of seven days.	a. Inspections and analysis will be performed of the PSWS basin and cooling towers.	a. A report exists and concludes that the volume of water in the PSWS basin is sufficient such that no active makeup is necessary to remove 2.02 x 10^7 MJ (1.92 x 10^{10} BTU) over a period of 7 days.
b. The PSWS pumps must have sufficient available net positive suction head at the pump suction location for the lowest probable water level of the heat sink.	b. Inspections and analysis will be performed of the PSWS basin.	b. A report exists and concludes that the PSWS pumps have sufficient available net positive suction head at the pump suction location for the lowest probable water level of the heat sink.

4.4 Offsite Power Systems ITAAC

Table 4-4 provides the site-specific offsite power ITAAC. The licensee shall perform and satisfy the ITAAC defined in Table 4-4 (from Fermi 3 COL Application Part 10, Table 2.4.8-1).

Table 4-4
ITAAC for offsite Power Systems

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
1.Independent offsite power sources supply electric power from the transmission network to the interface with the onsite plant power system (PPS)		
a. A minimum of two offsite power circuits are provided to the interface with the onsite PPS and are physically separate.	a. Inspections of the as-built offsite power supply transmission system will be performed.	a. A report exists and concludes the following inspection results: i) At least two offsite transmission circuits are provided to the interface with the onsite PPS. ii) The two offsite power circuits are physically separated by distance or physical barriers so as to minimize to the extent practical the likelihood of their simultaneous failure under design basis conditions. iii) The two offsite power circuits do not have a common takeoff structure or use a common structure for support.
b. The two offsite power circuits interfacing with the onsite PPS are electrically independent.	b. Test of the as-built offsite power system will be conducted by providing a test signal in only one offsite power circuit at a time.	b. A report exists and concludes that a test signal exists in only the circuit under test.
c. The breaker control power. Instrumentation and control circuits for the two offsite Dower circuits interfacing with the onsite PPS are electrically independent.	c. Tests of the as-built offsite breaker control power. Instrumentation and control circuits will be conducted by providing a test signal in only one offsite power circuit at a time.	c. A report exists and concludes that a test signal exists in only the circuit under test.
2. At least two offsite power circuits interfacing with the onsite portions of the PPS are each adequately rated to supply necessary load requirements during design basis operating modes.	2. Analyses of the offsite power system will be performed to evaluate the as-built ratings of each offsite power circuit interfacing with the onsite portions of the PPS against the load requirements determined in DCD ITAAC 2.13.1-2, Item, 9.	2. A report exists and concludes that at least two offsite power circuits from the transmission network up to the interface with the onsite portions of the PPS are each rated to supply the load requirements, during design basis operating modes, of their respective safety-related and nonsafety-related load groups.
3. Under normal steady state operation of the transmission system, the offsite portion of the PPS is capable of supplying required voltage to the interface with the onsite portions of the	3. Analyses of the as-built offsite portion of the PPS will be performed to evaluate the capability of each offsite power circuit to supply the voltage requirements at the interface with the onsite portion	3. A report exists and concludes that as-built offsite portion of the PPS, under normal steady state operation of the transmission system, is capable of supplying voltage at the interface with the

PPS that will support operation of safety-related loads during design basis operating modes.	of the PPS determined in DCD ITAAC 2.13.1-2, Item 9.	onsite portions of the PPS that will support operation of safety-related loads during design basis operating modes.
4. Under normal steady state operation of the transmission system, the offsite portion of the PPS is capable of supplying required frequency to the interface with the onsite portions of the PPS that will support operation of safety-related loads during design basis operating modes.	4. Analyses of the as-built offsite portion of the PPS will be performed to evaluate the capability of each offsite power circuit to supply the frequency requirements at the interface with the onsite portions of the PPS determined in DCD ITAAC 2.13.1-2, Item 9.	4. A report exists and concludes that as-built offsite portion of the PPS, under normal steady state operation of the transmission system, is capable of supplying required frequency at the interface with the onsite portions of the PPS that will support operation of safety-related loads during design basis operating modes.
5. The fault current contribution of the offsite portion of the PPS is compatible with the interrupting capability of the onsite short circuit interrupting devices.	5. Analyses of the as-built offsite portion of the PPS will be performed to evaluate the fault current contribution of each offsite power circuit at the interface with the onsite portions of the PPS.	5. A report exists and concludes the short circuit contribution of the as-built offsite portion of the PPS at the interface with the onsite portions of the PPS is compatible with the interrupting capability of the onsite fault current interrupting devices as determined in DCD ITAAC 2.13.1-2, Item 10.

4.5 Turbine Building ITAAC

Table 4-5 provides the site-specific turbine building (TB) ITAAC. The licensee shall perform and satisfy the ITAAC defined in Table 4-5 (from Fermi 3 COL Application Part 10, Table 2.4.15-1).

Table 4-5
ITAAC for the Turbine Building

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
1. Determine if the Fermi 3 soil properties are bounded by the site parameters in DCD Tier 1, Table 5.1-1.	Fermi 3 soil properties will be determined.	The Fermi 3 soil properties are bounded by the site parameters in DCD Tier 1, Table 5.1-1.
2. If the Fermi 3 soil properties are not bounded by the site parameters in DCD Tier 1, Table 5.1-1, then perform a Fermi 3 site-specific seismic soil-structure interaction (SSI) analysis for the turbine building (TB) following the method, as specified for seismic Category I structures, including the load combinations and the acceptance criteria, for loads associated with earthquakes. Determine whether the Fermi 3 site-specific SSI analysis is bounded by the TB seismic analysis specified in DCD Tier 1 ITAAC Table 2.16.8-1.	Site-specific SSI analyses for the TB will be conducted if necessary.	If the Fermi 3 soil properties are not abounded by the site parameters in DCD Tier 1, Table 5.1-1, the site-specific SSI analysis for the TB is bounded by the TB seismic analysis specified in the DCD Tier 1, ITAAC Table 2.16.8-1.

4.6 Radwaste Building ITAAC

Table 4-6 provides the site-specific radwaste building (RWB) ITAAC. The licensee shall perform and satisfy the ITAAC defined in Table 4-6 (from Femi 3 COL Application Part 10, Table 2.4.16-1).

Table 4-6
ITAAC for the Radwaste Building

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
1. Determine if the Fermi 3 soil properties are bounded by the site parameters in DCD Tier 1, Table 5.1-1.	Fermi 3 soil properties will be determined. Site-specific SSI and SSSI analyses of the RWB will be conducted, if necessary.	The Fermi 3 soil properties either (1) meet the site parameters in DCD Tier 1, Table 5.1-1, or (2) site-specific SSI analyses will be conducted. The results of Fermi 3 site-specific seismic SSI analyses of the RW are compared with the ESBWR RW seismic responses presented in DCD Tier 1, ITAAC Table 2.16.9-1 seismic analyses to confirm the Fermi 3 SSI is adequate for the ESBWR RWB seismic design.
2. If the Fermi 3 soil properties are not bounded by the site parameter in DCD Tier 1, Table 5.1-1, then perform a Fermi 3 site-specific seismic soil-structure interaction (SSI) analysis for the Radwaste Building (RW) following the method, as specified for seismic Category I structures, including the load combinations and the acceptance criteria, for loads associated with earthquakes. Determine whether the Fermi 3 site-specific SSI analysis is bounded by the RW seismic analysis specified in DCD Tier 1, ITAAC Table 2.16.9-1.	Site-specific analyses for the RW will be conducted if necessary.	If the Fermi 3 soil properties are not bounded by the site parameters in DCD Tier 1, Table 5.1-1, the site-specific SSI analysis for the RW is bounded by the RW seismic analysis specified in the DCD Tier 1, ITAAC Table 2.16.9-1.

4.7 Service Building ITAAC

Table 4-7 provides the site-specific service building (SB) ITAAC. The licensee shall perform and satisfy the ITAAC defined in Table 4-7 (from Fermi 3 COL Application Part 10, Table 2.4.17-1).

Table 4-7
ITAAC for the Service Building

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
1. Determine if the Fermi 3 soil properties are bounded by the site parameters in DCD Tier 1, Table 5.1-1.	Fermi 3 soil properties will be determined.	The Fermi 3 soil properties are bounded by the site parameters in DCD Tier 1, Table 5.1-1.
2. If the Fermi 3 soil properties are not bounded by the site parameters in DCD Tier 1, Table 5.1-1, then perform a Fermi 3 site-specific seismic soil-structure interaction (SSI) analysis for the Service Building (SB) following the method, as specified for seismic Category I structures, including the load combinations and the acceptance criteria, for loads associated with earthquakes. Determine whether the Fermi 3 site-specific SSI analysis is bounded by the SB seismic analysis specified in DCD Tier 1, ITAAC Table 2.16.10-1.	Site-specific SSI analyses for the SB will be conducted if necessary.	If the Fermi 3 soil properties are not bounded by the site parameters in DCD Tier 1, Table 5.1-1, the site-specific SSI analysis for the SB is bounded by the SB seismic analysis specified in the DCD Tier 1, ITAAC Table 2.16.10-1.

4.8 Ancillary Diesel Building ITAAC

Table 4-8 provides the site-specific ancillary diesel building (ADB) ITAAC. The licensee shall perform and satisfy the ITAAC defined in Table 4-8 (from Fermi 3 COL Application Part 10, Table 2.4.18-1).

Table 4-8
ITAAC for the Ancillary Diesel Building

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. Determine if the Fermi 3 soil properties are bounded by the site parameters in DCD Tier 1, Table 5.1-1.	Fermi 3 soil properties will be determined.	The Fermi 3 soil properties are bounded by the site parameters in DCD Tier 1, Table 5.1-1.
2. If the Fermi 3 soil properties are not bounded by the site parameters in DCD Tier 1, Table 5.1-1, then perform a Fermi 3 site-specific seismic soil-structure interaction (SSI) analysis for the Ancillary Diesel Building (ADB) following the method, as specified for seismic Category I structures, including the load combinations and the acceptance criteria , for loads associated with earthquakes . Determine whether the Fermi 3 site-specific SSI analysis is bounded by the ADB seismic analysis specified in DCD Tier 1, ITAAC Table 2.16.11-1.	Site-specific SSI analyses for the ADB will be conducted if necessary.	If the Fermi 3 soil properties are not bounded by the site parameters in DCD Tier 1, Table 5.1-1, the site-specific SSI analysis for the ADB is bounded by the ADB seismic analysis specified in the DCD Tier 1, ITAAC Table 2.16 .11-1.

A.3 Final Safety Analysis Report (FSAR) Commitments

The following FSAR commitments are identified as the responsibility of the licensee:

SER Section	Description
1.3.6	• Commitment (COM 1.1-001) – Construction and startup schedules will be provided after the issuance of the COL once a positive decision to construct the plant. • Commitment (COM 1.2-001) – To the extent practical, modular construction techniques were applied during ABWR construction projects will be adapted and/or modified for use during the ESBWR construction. Modularization reviews will be performed to develop a plan for bringing the ABWR experience into the ESBWR. Once completed, the results of the modularization reviews will be used as guidance to develop the detailed design of the areas affected by modularization. • Commitment (COM 1.4-001) – The primary contractor for the site engineering was not yet selected at the time of the COLA submittal; this information will be supplied in the FSAR update following the selection. • Commitment (COM 1.12-001) – Managerial and administrative controls are utilized to identify preventive and mitigative measures and to provide notification of hazardous activity initiation, in order to prevent or minimize exposure of SSCs to the identified hazards. Applicable managerial and administrative controls are listed in Table 1.12-203.
2.3.3.5	Commitment (COM 2.3-003) – The new meteorological tower will be operational for at least one year before the decommissioning of the existing onsite meteorological tower. The meteorological data recorded concurrently from the current and new onsite meteorological towers will undergo a detailed analysis to ensure that the meteorological parameters measured at the new meteorological tower are representative of the atmospheric conditions at the Fermi site.
2.4.2.5	Commitment (COM 2.4-002) – Detailed design will incorporate best industry practices included in "The Guidebook of Best Management Practices for Michigan Watersheds" to provide added erosion protection to the slopes, even though they receive very little runoff. These practices include mulching, seeding, sodding, soil management, trees, shrubs, and ground covers. To be conservative, erosion protection methods selected will be based on runoff velocities for a local PMP condition not taking credit for the storm water drains. Where necessary, erosion protection will be provided for breaking waves during a postulated surge/seiche event.
2.4.12.5	Commitment (COM 2.4-12-001) – However, prior to the commencement of construction activities, the monitoring well network will be evaluated to determine if any significant data gaps are created by the abandonment of existing wells. As part of the detailed design for Fermi 3, the present groundwater monitoring programs will be evaluated with respect to the addition of Fermi 3 to determine if any modification of the existing programs is required to adequately monitor plant effects on the groundwater.
2.5.4.5	Commitment (COM 2.5.4-001) – Develop a contingency plan for mitigation of any settlement before the start of the Fermi 3 construction.

3.7.4.5	• Commitment (COM 3.7-001) – Implement the seismic monitoring program described in this subsection [ESBWR DCD Subsection 3.7.4.5], including the necessary test and operating procedures, before the receipt of fuel onsite.
3.9.5	• Commitment (COM 3.9-001) – For reactor internals other than the steam dryer, the comprehensive vibration assessment program will be developed and implemented as described in DCD Appendix 3L with no departures. The vibration measurement and inspection programs will comply with the guidance specified in RG 1.20, Revision 3, consistent with the Fermi 3 reactor internals classification. A summary of the vibration analysis program and description of the vibration measurement (including measurement locations and analysis predictions) and inspection phases of the comprehensive vibration inspection program will be submitted to the NRC six months prior to implementation. • Commitment (COM 3.9-002) – The equipment stress reports identified in this DCD will be completed within six months of completion of DCD ITAAC Table 3.1-1. • Commitment (COM 3.9-003) – For the ASME Class 1, 2, and 3 systems listed in DCD Tier 1 Section 3.1 that contain snubbers, a plant-specific table will be prepared in conjunction with the closure of the system-specific ITAAC for the piping and component design and will include the following specific snubber information. • Commitment (COM 3.9-004) – The FSAR will be revised as necessary in a subsequent update to address the results of the stress analysis. • Commitment (COM 3.9-005) – This information will be included in the FSAR as part of a subsequent FSAR update. • Commitment (COM 3.9-006) – For reactor internals other than the steam dryer, the preliminary and final reports (as necessary) that together summarize the results of the vibration analysis, the measurements, and the inspection programs will be submitted to the NRC within 60 and 180 days, respectively, following the completion of the programs.
3.10.5	• Commitment (COM 3.10-003) – Detroit Edison shall submit to the NRC, no later than 1 year after issuance of the combined license or at the start of construction as defined in 10 CFR 50.10(a), whichever is later, its implementation schedules for completing of the following ITAACs. Detroit Edison shall submit updates to the ITAAC schedules every 6 months thereafter and, within 1 year of its scheduled date for initial loading of fuel, and shall submit updates to the ITAAC schedules every 30 days until the final notification is provided to the NRC under paragraph (c)(1) of this section [10 CFR 52.99]. • Commitment (COM 3.10-001) – The Dynamic Qualification Report and documentation that describe the seismic and dynamic qualification methods will be made available for NRC staff review, inspection, and audit. Information that verifies the seismic and dynamic qualification will be made available to the NRC to facilitate reviews, inspections, and audits throughout the process. • Commitment (COM 3.10-002) – FSAR information will be revised, as necessary, as part of a subsequent FSAR update.
5.2.5.5	Commitment (COM 13.5-002) – Develop operating procedures at least six months before fuel load to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations.

5.3.2.5	Commitment (COM 05.03-002) – Prior to fuel load, the pressure-temperature limit curves will be updated to reflect plant-specific material properties, if required.
6.4.5	The following commitments are to track implementation milestones for operator training and procedures for control room habitability. (1) Non Licensed Plant Staff Training Program – 18 months prior to scheduled fuel loading. (COM 13.4-028) (2) Reactor Operator Training Program – 18 months before the scheduled fuel loading. (COM 13.4-016) (3) Operating procedures are developed at least 6 months before the fuel loading to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations. (COM 13.5-002)
6.6.5	The following commitments to track implementation of the PSI/ISI programs: (1) ISI – Implemented prior to commercial service (COM 13.4-024) (2) PSI – Completion prior to initial plant startup (COM 13.4-026)
8.2.5	• Commitment (COM 8.2-001) – Plant operating procedures, including off-normal operating procedures, associated with the monitoring system will be developed in accordance with FSAR Subsection 13.5.2.1 at least six months prior to fuel load. • Commitment (COM 8.2-002) – Maintenance and testing procedures, including calibration, set point determination and troubleshooting procedures, associated with the monitoring system will be developed in accordance with FSAR Subsection 13.5.2.2.6.1 prior to fuel loading. • Commitment (COM 8.2-003) – Control room operator and maintenance technician training associated with the operation and maintenance of the monitoring system will be developed in accordance with FSAR Section 13.2.1 for Reactor Operators and FSAR Section 13.2.2 for Non Licensed Plant Staff. Training will be completed prior to fuel loading.
8.3.1.5	Commitment (COM 8.3-001) – The COL Applicant will verify that owner yard scope site specific underground or inaccessible power and control cable runs to the PSWS and DG Fuel Oil Transfer System that have accident mitigation functions and are susceptible to protracted exposure to wetted environments or submergence as a result of tidal, seasonal, or weather event water intrusion are adequately identified and monitored for appropriate corrective actions under MR program described in Section 17.6.4.
9.1.4.5	Commitment (COM 9.1-001) – Fuel handling procedures are developed six months before fuel receipt to allow sufficient time for plant staff familiarization, to allow NRC staff adequate time to review procedures, and to develop operator licensing examinations.
9.2.5.5	Commitment (COM 9.2-001) – Procedures that identify and prioritize available makeup sources seven days after an accident, and provide instructions for establishing necessary connections, will be developed in accordance with the procedure development milestone in Section 13.5.

9.5.1.5	• Commitment (9.5-001) – Testing will be performed to demonstrate that the secondary fire protection pump circuit supplies a minimum of 484 m^3/hr (2,130 gpm) with sufficient discharge pressure to develop a minimum of 738 kPaG (107 psig) line pressure at the Turbine Building/yard interface boundary. This cannot be performed until the system is built. This activity will be completed prior to fuel receipt. • Commitment (COM 9.5-002) – Mechanical and electrical penetration seals and electrical raceway fire barrier systems are qualified to the requirements delineated in RG 1.189 by a recognized laboratory in accordance with the applicable guidance of NFPA 251 and/or ASTM E-119. Detailed design in this area is not complete. Specific design and certification test results for penetration seal designs and electrical raceway fire barrier systems will be available for review at least six months prior to fuel receipt. • Commitment (COM 9.5-003) – Procedures for manual smoke control will be developed as part of Fire Protection Program implementation. • Commitment (COM 9.5-004) – A compliance review of the final as-built design against the assumptions and requirements stated in the FHA will be completed prior to fuel load. • Commitment (COM 9.5-006) – Implementation of the fire brigade will be in accordance with the milestone in Section 13.4 for the Fire Protection Program. • Commitment (COM 9.5-007) – The procedures will be developed six months prior to fuel receipt and will be fully implemented prior to fuel receipt. • Commitment (COM 9A-001) – A detailed fire hazards analysis of the yard area that is outside the scope of the certified design cannot be completed until cable routing is performed during final design. This information will be provided six months prior to fuel load. • Commitment (COM 9A-002) – A detailed fire hazards analysis of the yard area that is outside the scope of the certified design, which includes the Service Building, cannot be completed until cable routing is performed during final design. This information will be provided 6 months prior to fuel load. • Commitment (COM 9A-003) – A detailed fire hazards analysis of the yard area that is outside the scope for the certified design, which includes the Service Water/Water Treatment Building, cannot be completed until cable routing is performed during final design. This information will be provided six months prior to fuel load.
13.5.1.5	Commitment (COM 13.5-001) – Procedures are developed prior to fuel load to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations.
13.5.2.5	• Commitment (13.5-001) – Procedures are developed prior to fuel loading to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations. • Commitment (13.5-002) – Operating procedures are developed at least 6 months prior to fuel loading to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations. • Commitment (13.5-003) – Submit the procedure development program, as

	described in the PGP for EOPs, to the NRC at least three months prior to the planned date to begin formal operator training on the EOPs. • Commitment (13.5-004) – Develop an initial program based on service conditions, experience with comparable equipment and vendor recommendations is developed prior to fuel loading.
13.6.5	The applicant identified the following commitments to track implementation of the Physical Security Program, the Safeguards Contingency Program, and the Training and Qualification Program: 1. Physical Security Program - Implemented prior to fuel onsite [COM 13.4-017] 2. Safeguards Contingency Program - Implemented prior to fuel onsite [COM 13.4-017] 3. Training and Qualification Program - Implemented prior to fuel onsite [COM 13.4-017]
13.7.5	Commitment (COM 13.7-001) – Prior to the issuance of a Combined License for Fermi 3, Detroit Edison will review and revise, as necessary, the Fermi 3 construction phase FFD Program should substantial revisions occur to either NEI 06-06 following NRC endorsement or to the requirements of 10 CFR Part 26.
13.8.5	Commitment (13.5-032) – Develop and implement a CSP prior to fuel on-site (Protected Area).
14.3.5 and 14.3.5	• Commitment (3.10-003) – Detroit Edison shall submit to the NRC, no later than 1 year after issuance of the combined license or at the start of construction as defined in 10 CFR 50.10(a), whichever is later, its implementation schedules for completing of the following ITAACs. Detroit Edison shall submit updates to the ITAAC schedules every 6 months thereafter and, within 1 year of its scheduled date for initial loading of fuel, shall submit updates to the ITAAC schedules every 30 days until the final notification is provided to the NRC under paragraph (c)(1) of this section. • Commitment (14.3-001) – For piping (DAC) ITAAC; (1) the ASME Code design reports for safety-related piping packages and (2) the as-designed Pipe Break Analysis Report will be completed per ESBWR DCD ITAAC Table 3.1-1 for all the applicable systems in order to support closure of the DAC ITAAC. Information will be made available for NRC review, inspection, and audit on a system basis. Information will be made available to the NRC to facilitate reviews, inspections, and audits throughout the process. • Commitment (14.3-002) – For human factors engineering DAC, HFE Design Acceptance Criteria ITAAC consists of a series of results summary reports which verify that the specific associated Design Commitment is met. The summary reports will be made available at each stage for NRC review, inspection, and audit on an element by element basis. Information (procedures and test programs) will be made available to the NRC to facilitate reviews, inspections, and audits throughout the process. • Commitment (14.3-003) – For instrumentation and controls DAC, the set of ESBWR digital I&C Design Acceptance Criteria ITAAC establishes a phased Design Acceptance Criteria ITAAC closure process. Procedures and test programs necessary to demonstrate that the Design Acceptance Criteria ITAAC requirements are met will be used at each phase to certify to the NRC that the design is in compliance with the certified design. Information will be made

	available for NRC review, inspection, and audit on a system basis. Information will be made available to the NRC to facilitate reviews, inspections, and audits throughout the process.
18.5	Commitment (COM 18.13-001) – The HPM program will be implemented prior to the beginning of the first licensed operator training class.
19.2.5	Commitment (COM 19.2-001) – As-built SSC HCLPF values will be compared to those assumed in the ESBWR seismic margin analysis. Deviations from the HCLPF values or other assumptions in the seismic margins evaluation will be analyzed to determine if any new vulnerabilities have been introduced. This comparison and analysis will be completed before fuel load.
19.A.5	The following commitment to meet the requirements of 10 CFR 50.54(hh)(2) and 10 CFR 52.80: • Commitment (COM 13.4-033) – Develop Mitigative Strategies Description and Plans before the fuel loading authorization per the 10 CFR 52.103(g).

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10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

This final safety evaluation report (FSER) documents the U.S. Nuclear Regulatory Commission (NRC) staff's technical review of the combined license (COL) application submitted for the Enrico Fermi Unit 3.

In a letter dated September 18, 2008, DTE Electric Company (DTE, formerly Detroit Edison Company) submitted an application to the NRC for a COL to construct and operate an Economic Simplified Boiling-Water Reactor pursuant to the requirements of Section 103 and 185(b) of the Atomic Energy Act of 1954 as Amended (AEA), Title 10 of the Code of Federal Regulations (10 CFR) Part 52, "Licenses, Certifications and Approval for Nuclear Power Plants," and the associated material licenses under 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"; 10 CFR Part 40, "Domestic Licensing of Source Material"; and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." By letter dated December 21, 2012, the Detroit Edison Company informed the NRC that effective January 1, 2013, the name of the company would be changed to "DTE Electric Company." The legal entity remains the same. This reactor will be identified as Fermi 3 and will be located on the existing Fermi site in Monroe County, Michigan.

This FSER presents the results of the staff's review of information submitted in conjunction with the COL application.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)
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