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United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-1943, Vol. 2

Environmental Impact Statement for Combined Licenses (COLs) for Comanche Peak Nuclear Power Plant Units 3 and 4

Draft Report for Comment

U.S. Nuclear Regulatory Commission
Office of New Reactors
Washington, DC 20555-0001

U.S. Army Corps of Engineers
U.S. Army Engineer District, Fort Worth
Fort Worth, TX 76102-6199

US Army Corps of Engineers®

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Paperwork Reduction Act Statement

This NUREG references information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). There were no new information collection requirements in this NUREG. The existing information collections in the NUREG were previously approved by the Office of Management and Budget, approval numbers 3150-0014; 3150-0011; 3150-0021; 3150-0151; 3150-0008; 3150-0002; and 3150-0093.

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Abstract

This environmental impact statement (EIS) has been prepared to satisfy the requirements of the National Environmental Policy Act of 1969, as amended (NEPA). This EIS has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Luminant Generation Company LLC (Luminant), acting for itself and as agent for Nuclear Project Company LLC (subsequently renamed Comanche Peak Nuclear Power Company LLC), for combined construction permits and operating licenses (combined licenses or COLs). The proposed actions related to the Luminant application are (1) NRC issuance of COLs for two new nuclear power reactor units (Units 3 and 4) at the Comanche Peak Nuclear Power Plant (CPNPP) site in Hood and Somervell Counties, Texas, and (2) U.S. Army Corps of Engineers (Corps) issuance of a permit to perform certain construction activities on the site. The Corps is participating with the NRC in preparing this EIS as a cooperating agency and participates collaboratively on the review team.

This EIS includes the analysis by the NRC and Corps staff that considers and weighs the environmental impacts of building and operating two new nuclear units at the CPNPP site and at alternative sites, and mitigation measures available for reducing or avoiding adverse impacts.

The EIS includes the evaluation of the proposed action's impacts to waters of the United States pursuant to Section 404 of the Federal Water Pollution Control Act (Clean Water Act) and Section 10 of the Rivers and Harbors Appropriation Act of 1899. The Corps will conduct a public interest review in accordance with the guidelines promulgated by the U.S. Environmental Protection Agency under authority of Section 404(b) of the Clean Water Act. The public interest review, which will be addressed in the Corps' permit decision document, will include an alternatives analysis to determine the Least Environmentally Damaging Practicable Alternative.

After considering the environmental aspects of the proposed action, the NRC staffs' preliminary recommendation to the Commission is that the COLs be issued as requested. This recommendation is based on (1) the application, including the Environmental Report (ER) submitted by Luminant and Luminant's responses to the NRC and Corps staffs' requests for additional information (RAIs); (2) consultation with Federal, State, Tribal, and local agencies; (3) the NRC and Corps staffs' independent review; (4) the NRC and Corps staffs' consideration of comments related to the environmental review that were received during the public scoping process; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS. The Corps permit decision will be made following issuance of the final EIS, and the Corps will issue its Record of Decision based, in part, on this EIS.

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Executive Summary

By letter dated September 19, 2008, the U.S. Nuclear Regulatory Commission (NRC) received an application from Luminant Generation Company LLC (Luminant), acting for itself and as agent for Nuclear Project Company LLC (subsequently renamed Comanche Peak Nuclear Power Company LLC), for combined construction permits and operating licenses (combined licenses or COLs) for two new nuclear reactor power units (the proposed Units 3 and 4) at the Comanche Peak Nuclear Power Plant (CPNPP) site, which is located in Hood and Somervell Counties, Texas. The NRC staff's evaluation is based on Luminant's November 2009 revision to the application, responses to requests for additional information (RAIs), and supplemental letters.

The proposed actions related to the CPNPP Unit 3 and 4 application are (1) NRC issuance of COLs for two new nuclear power reactor units at the CPNPP site and (2) U.S. Army Corps of Engineers (Corps) issuance of a permit pursuant to Section 404 of the Federal Water Pollution Control Act (Clean Water Act) and Section 10 of the Rivers and Harbors Act to perform certain construction activities on the site. The Corps is participating as a cooperating agency with the NRC in preparing this environmental impact statement (EIS) and participates collaboratively on the review team. The reactor specified in the application is a Mitsubishi Heavy Industries, Ltd. (MHI), U.S. Advanced Pressurized-Water Reactor (US-APWR) design (hereafter referred to as US-APWR in this EIS).

Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA) (42 USC 4321 et seq.) directs that an EIS be prepared for major Federal actions that significantly affect the quality of the human environment. The NRC has implemented Section 102 of NEPA in Title 10 of the Code of Federal Regulations (CFR) Part 51. Further, in 10 CFR 51.20, the NRC has determined that the issuance of a COL under 10 CFR Part 52 is an action that requires an EIS.

The purpose of Luminant's requested NRC action is to obtain COLs to construct and operate two new baseload nuclear power units. These licenses are necessary but not sufficient for construction and operation of the units. A COL applicant must obtain and maintain the necessary permits from other Federal, State, Tribal, and local agencies and permitting authorities. Therefore, the purpose of the NRC's environmental review of Luminant's application is to determine the impacts on the human environment if two new nuclear power units of the proposed US-APWR design are constructed and operated at the CPNPP site. The purpose of Luminant's requested Corps action is to obtain a permit to perform regulated activities that would have an effect on waters of the United States.

Upon acceptance of the Luminant application, the NRC began the environmental review process described in 10 CFR Part 51 by publishing in the *Federal Register* (FR) a Notice of Intent (73 FR 9604) to prepare an EIS and to conduct scoping. On January 6, 2009, the NRC held two scoping meetings in Glen Rose, Texas, to obtain public input on the scope of the environmental review. The staff reviewed the comments received during the scoping process and contacted Federal, State, Tribal, regional, and local agencies to solicit comments.

To gather information and to become familiar with the sites and their environs, the NRC, its contractors [the Oak Ridge National Laboratory (ORNL) and Information Systems Laboratories, Inc. (ISL)], and the Corps visited the CPNPP site in February 2009 to examine the ecological resources of the site and to conduct an environmental site audit. The NRC and its contractors also visited three alternative sites (the Coastal site, the Pineland site, and the Tradinghouse site) in Texas in February 2009. During the site visits, the NRC staff and its contractors met with Luminant staff, public officials, and the public.

Included in this EIS are (1) the results of the joint NRC/Corps review team's analyses, which consider and weigh the environmental effects of the proposed actions; (2) potential mitigation measures for reducing or avoiding adverse effects; (3) the environmental impacts of alternatives to the proposed action; and (4) the NRC staff's preliminary recommendation regarding the proposed action.

To guide its assessment of the environmental impacts of a proposed action or alternative actions, the NRC has established a standard of significance for impacts based on Council on Environmental Quality guidance (40 CFR 1508.27). Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, provides the following definitions of the three significance levels – SMALL, MODERATE, and LARGE:

SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

In preparing this EIS, the review team reviewed the application, including the Environmental Report (ER) submitted by Luminant; consulted with Federal, State, Tribal, and local agencies; and followed the guidance set forth in NUREG-1555, *Environmental Standard Review Plan*. In addition, the NRC staff considered the public comments related to the environmental review received during the scoping process. Comments within the scope of the environmental review are included in Appendix D of this EIS.

The NRC staff's preliminary recommendation to the Commission related to the environmental aspects of the proposed action is that the COLs be issued as requested. This recommendation is based on (1) the application, including the ER submitted by Luminant and Luminant's supplemental letters and responses to the review team's RAIs; (2) consultation with other Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the review team's consideration of public scoping comments; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS. The Corps permit decision will be made following issuance of the final EIS, and the Corps will issue its Record of Decision (ROD) based, in part, on this EIS.

A 75-day comment period will begin on the date of publication in the FR of the U.S. Environmental Protection Agency Notice of Availability of the filing of the draft EIS to allow members of the public and agencies to comment on the results of the environmental review. During that period, the NRC and Corps staff will conduct a public meeting near the CPNPP site to describe the results of the environmental review, respond to questions, and accept public comments. After the comment period, the review team will consider all the comments received. The final EIS will include these comments and the review team's responses.

The NRC staff's evaluation of the site safety and emergency preparedness aspects of the proposed action will be addressed in the NRC's Safety Evaluation Report, currently anticipated to be published in December 2011. The reactor specified in the application is the MHI US-APWR design, which is currently undergoing a design certification review. The NRC staff's evaluation of the design certification and final rulemaking is currently anticipated to be completed in September 2011.

Abbreviations/Acronyms

1	µg	micrograms
2	µS	microsiemens
3	X/Q	dispersion values
4	°C	degree(s) Celsius
5	°F	degree(s) Fahrenheit
6	A/B	auxiliary building
7	AADT	Annual Average Daily Traffic
8	ABWR	Advanced Boiling Water Reactor
9	ac	acre(s)
10	AC	alternating current
11	ACHP	Advisory Council on Historic Preservation
12	AD	Attainment Demonstration
13	AEC	Atomic Energy Commission
14	AEP	Archaeology and Ethnography Program
15	ALARA	as low as reasonably achievable
16	AML	abandoned mine land
17	AMUD	Acton Municipal Utility District
18	AN	ammonia nitrogen
19	APE	Area of Potential Effect
20	APLIC	Avian Powerline Interaction Committee
21	ASLB	Atomic Safety and Licensing Board
22	AWEA	American Wind Energy Association
23	BA	Biological Assessment
24	BDTF	Blowdown Treatment Facility
25	BEA	Bureau of Economic Analysis
26	BEIR	Biological Effects of Ionizing Radiation
27	BLS	U.S. Bureau of Labor Statistics
28	BMP	best management practice
29	BOD	biochemical oxygen demand
30	Bq	Becquerel(s)
31	BRA	Brazos River Authority
32	BRM	Brazos River mile
33	Btu	British thermal unit(s)
34	BUL	balancing up load
35	BWR	boiling-water reactor
36	C/V	containment vessel
37	CAA	Clean Air Act
38	CBC	Christmas Bird Count
39	CBOD	carbonaceous biochemical oxygen demand
40	CCD	Census County Division
41	CCWS	component cooling water system

CDC	Center for Disease Control and Prevention
CDF	core damage frequency
CDP	census-designated place
CDR	Capacity, Demand, and Resources Report
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second (water flow)
cfu	colony forming units
Ci	Curie(s)
CLNGT	Calhoun Liquefied Natural Gas Terminal
cm	centimeters
cm^2	centimeter(s) squared
CMP	Coastal Management Program
CMZ	Coastal Management Zone
CO	carbon monoxide
CO_2	carbon dioxide
COL	combined license
Corps	U.S. Army Corps of Engineers
CP	construction permit
CPCN	Certificate of Public Convenience and Necessity
CPNPP	Comanche Peak Nuclear Power Plant
CPS	Energy City Public Service Board of San Antonio, Texas
CPUE	catch per unit effort
CR	County Road (CR 360, CR 392)
CREZ	Competitive Renewable Energy Zones
CS	containment spray
CVCS	Chemical and Volume Control System
CVDT	containment vessel reactor coolant drain tank
CWA	Clean Water Act
CWIS	circulating water intake structure
CWS	circulating water system
d	day
D/Q	annual normalized total surface deposition rates
DA	Department of the Army
dBA	decibel(s) (acoustic)
DBA	Design Basis Accident
DBH	diameter at breast height
DC	direct current
DCD	Design Control Document
DDT	dichlorodiphenyltrichloroethane
DFPS	Department of Family Protective Services
DFW	Dallas–Fort Worth
DHV	design hourly volume
DNL	day-night average sound levels
DO	dissolved oxygen

DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DSM	demand side management
DSWG	Demand Side Working Group
DWS	demineralized water system
EAB	Exclusion Area Boundary
ECP	essential cooling pond
EFH	Energy Future Holdings Corporation
EFH	essential fish habitat
EIA	Energy Information Administration
EIS	environmental impact statement
ELCC	effective load carrying capacity
ELF	extremely low frequency
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ERCOT	Electric Reliability Council of Texas
ESA	U.S. Endangered Species Act of 1973, as amended
ESP	early site permit
ESRP	Environmental Standard Review Plan
ESWS	essential service water system
FAA	Federal Aviation Administration
FAC	free available chlorine
FC	fecal coliform
FDA	final design approval
FERC	Federal Energy Regulatory Commission
FES	Final Environmental Statement
FM	Farm-to-Market Road
FPS	fire protection system
FR	Federal Register
FRA	Federal Railroad Administration
FSAR	Final Safety Analysis Report
ft	foot or feet
ft^2	square feet
ft^3	cubic feet
FWS	U.S. Fish and Wildlife Service
gal	gallon(s)
GAM	general area monitoring
GATF	Generation Adequacy Task Force
GBq	gigabecquerel
GBRA	Guadelupe-Blanco River Authority
GCC	global climate change
GCD	Groundwater Conservation District
GCRP	Global Change Research Program

GE	General Electric
GED	Global Energy Decisions, Inc.
GEIS	generic environmental impact statement
GEIS-DECOM	GEIS-Decommissioning of Nuclear Facilities (NUREG-0586)
GHG	greenhouse gas
GIT	Georgia Institute of Technology
GIWW	Gulf Intracoastal Waterway
gpd	gallon(s) per day
gpm	gallon(s) per minute
GPS	global positioning system
GTG	gas turbine generator
GWMS	Gaseous Waste Management System
ha	hectare(s)
HCLPF	high confidence of low probability of failures
HCP	Ham Creek Park
hr	hour(s)
HT	holdup tank
HUD	U.S. Department of Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
Hz	hertz
IA	Interconnection Agreement
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
IGCC	integrated gasification combined cycle
in.	inch(es)
INL	Idaho National Laboratory
IOU	investor owned utility
ISD	Independent School District
ISFSI	Independent Spent Fuel Storage Installation
ISL	Information Systems Laboratories, Inc.
ISO	independent system operator
JPPP	E.S. Joslin Power Plant Project
KC	Keystone Center
km	kilometer(s)
km^2	square kilometer(s)
kV	kilovolt(s)
kWh	kilowatt-hour(s)
L	liter(s)
LaaR	load acting as resource
lb	pound(s)
LC_{50}	concentration lethal to 50% of the sample population
LCRA	Lower Colorado River Authority

LCRWPG	Lower Colorado Regional Water Planning Group
Ldn	day-night average sound level
LEDPA	least environmentally damaging practicable alternative
lin ft	linear foot (feet)
LLMW	low-level mixed waste
LLW	low-level radioactive waste
LOCA	loss of coolant accident
LOS	Level of Service
LPSD	low power shutdown
LPZ	low population zone
LRF	large release frequency
LST	local standard time
LTSF	Long-Term Storage Facility
LVW	low volume waste
LWA	Limited Work Authorization
LWMS	liquid waste management system
LWR	light-water reactor
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mA	milliampere
MBq	megabecquerel
MCCI	molten corium-to-concrete interaction
mcf	million cubic feet
mCi	millicurie
MCR	main cooling reservoir
MDC	main drainage channel
MDCT	mechanical draft cooling tower
MEI	maximally exposed individual
mG	milligauss
mg	milligram(s)
MGD	million gallon(s) per day
MHI	Mitsubishi Heavy Industries, Ltd.
MHz	megahertz
mi	mile(s)
mi^2	square mile(s)
min	minute
MIT	Massachusetts Institute of Technology
mL	milliliter(s)
MMS	Minerals Management Service
MNES	Mitsubishi Nuclear Energy Systems
mo	month
MOU	Memorandum of Understanding
MOX	mixed oxide (fuel)
mph	mile(s) per hour

mpn	most probable number
mR	milliroentgen
mrad	millirad(s)
mrem	millirem(s)
MSA	Metropolitan Statistical Area
MSL	above mean sea level
mSv	millisievert(s)
MT	metric ton(s) (or tonne[s])
MTU	metric ton(s) of uranium
MW	megawatt(s)
MW(e)	megawatt(s) electrical
MW(t)	megawatt(s) thermal
MWd	megawatt-day(s)
MW-h	megawatt-hour(s)
MWS	makeup water system
N	nitrogen
NAAQS	National Ambient Air Quality Standard
NCA	Noise Control Act
NCI	National Cancer Institute
NCRP	National Council on Radiation Protection & Measurements
NEPA	National Environmental Policy Act of 1969, as amended
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NESWS	nonessential service water system
NGO	nongovernmental organization
NHPA	National Historic Preservation Act of 1966, as amended through 2000
NIEHS	National Institute of Environmental Health Sciences
NMM	navigation mile marker
NO_2	nitrite
NO_3	nitrate
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxide(s)
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NWPCC	Northwest Power and Conservation Council
O&M	operations and maintenance
ODCM	offsite dose calculation manual
OECD	Organization for Economic Cooperation and Development
OPO4	orthophosphate
ORNL	Oak Ridge National Laboratory
OSF	Onsite Staging Facility
OSHA	Occupational Safety and Health Administration

P	phosphorous
PAM	primary amoebic meningoencephalitis
PBS&J	Post, Buckley, Schuh & Jernigan, Inc.
pCi	picocuries
PGC	Power Generation Company
PGMA	Priority Groundwater Management Plan
PIR	Public Interest Review
PKL	Possum Kingdom Lake
PM	particulate matter
PM_{10}	particulate matter with a diameter of 10 microns or less
$PM_{2.5}$	particulate matter with a diameter of 2.5 microns or less
PNNL	Pacific Northwest National Laboratory
ppm	parts per million
ppt	parts per thousand
PRA	probabilistic risk assessment
PSD	prevention of significant deterioration
PSWS	potable and sanitary water system
PUCT	Public Utility Commission of Texas
PURA	Public Utilities Regulatory Act
PWR	pressurized-water reactor(s)
Q	flow
QSE	qualified scheduling entity
R/B	reactor building
RAI	Request for Additional Information
RCDT	reactor coolant drain tank
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RCW	Reactor Building Cooling Water
rem	Roentgen equivalent man (a special unit of radiation dose)
REMP	radiological environmental monitoring program
REP	retail electric provider
RFP	Reasonable Further Progress
RHR	residual heat removal
RIMS	Regional Input-Output Model System
RLE	review level earthquake
RMPF	Reservoir Makeup Pumping Facility
RMR	reliability must run
ROD	Record of Decision
ROI	region of interest
ROW	right(s)-of-way
rpm	revolutions per minute
RRY	reference reactor year
RSICC	Radiation Safety Information Computational Center
RSW	Reactor Service Water
RV	recreational vehicle

RWST	refueling water storage tank
Ryr	reactor-year
s	second(s)
SACTI	Seasonal and Annual Cooling Tower Impacts Prediction Code
SAMA	severe accident mitigation alternative
SAMDA	severe accident mitigation design alternative
SAWS	San Antonio Water System
SB	Senate Bill
SCR	Squaw Creek Reservoir
SCWD	Somervell County Water District
SER	Safety Evaluation Report
SES	Steam Electric Station
SFSI	Spent Fuel Storage Installation
SG	steam generator
SGBD	Steam Generator Blowdown
SGIA	signed generation permit agreement
SGTR	steam generator tube rupture
SH	state highway
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMA	Seismic Margin Analysis
SNDC	summer net dependable capability
SO_2	sulfur dioxide
SOP	System Operation Permit
SO_x	sulfur oxide
SPP	Southwest Power Pool
SSC	structure, system, or component
STP	South Texas Project Electric Generating Station
STPNOC	STP Nuclear Operating Company
SWATS	Surface Water and Treatment System
SWMS	Solid Waste Management System
SWPPP	Stormwater Pollution Prevention Plan
SWWTS	sanitary wastewater treatment system
T&D	transmission and distribution
TAC	Texas Administrative Code
TBEG	Texas Bureau of Economic Geology
TBq	terabecquerel(s)
TCC	Texas Central Company
TCEQ	Texas Commission on Environmental Quality
TCS	turbine component cooling water system
TCWP	Texas Coastal Watershed Program
TDS	total dissolved solids
TDSHS	Texas Department of State Health Services
TEDE	total effective dose equivalent

Temp	temperature
THC	Texas Historical Commission
THPO	Tribal Historic Preservation Office
TIS	Texas Interconnected System
TLD	thermoluminescent dosimeter
TMDL	total maximum daily load
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TPWP	Texas Prairie Wetlands Project
tpy	tons per year
TRC	total residual chlorine
TSDC	Texas State Data Center
TSS	total suspended solids
TSWQS	Texas Surface Water Quality Standard
TUGC	Texas Utilities Generating Company
TW	terawatt
TWC	Texas Water Code
TWDB	Texas Water Development Board
TW-h	terawatt-hour(s)
TX	Texas
TxDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
UC	University of Chicago
U_3O_8	triuranium octaoxide (“yellowcake”)
UF_6	uranium hexafluoride
UFC	uranium fuel cycle
UHS	ultimate heat sink
UO_2	uranium oxide
USACE	U.S. Army Corps of Engineers (Corps)
US-APWR	U.S. Advanced Pressurized Water Reactor
USCB	U.S. Census Bureau
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program National Assessment
USGS	U.S. Geological Survey
VCNS	Victoria County Nuclear Station
VCT	volume control tank
VFD	Volunteer Fire Department
VOC	volatile organic compound
WBR	Wheeler Branch Reservoir
WDA	Workforce Development Area
WHO	World Health Organization
WMA	Wildlife Management Area
WWS	wastewater system

1	yd	yard(s)
2	yd^3	cubic yard(s)
3	yr	year(s)

Appendix A

Contributors to the Environmental Impact Statement

Appendix A

Contributors to the Environmental Impact Statement

The overall responsibility for the preparation of this environmental impact statement was assigned to the Office of New Reactors, U.S. Nuclear Regulatory Commission (NRC). The statement was prepared by members of the Offices of New Reactors with assistance from other NRC organizations, the U.S. Army Corps of Engineers, the Oak Ridge National Laboratory, and the Information Sciences Laboratory.

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Michelle Moser	Office of New Reactors	Project Manager/Advisor
Nebiyu Tiruneh	Office of New Reactors	Surface Water Hydrology
Daniel Barnhurst	Office of New Reactors	Groundwater Hydrology; Geology
Harriet Nash	Office of New Reactors	Aquatic Ecology
Peyton Doub	Office of New Reactors	Terrestrial Ecology; Land Use
Dan Mussatti	Office of New Reactors	Socioeconomics; Environmental Justice; Benefit-Cost Analysis; Need for Power
Barry Zalcman	Office of New Reactors	Alternatives
Rich Emch	Office of New Reactors	Health Physics; Human Health; Cultural Resources; Nonradiological Waste
Richard Clement	Office of New Reactors	Health Physics (Operations)
Ron LaVera	Office of New Reactors	Health Physics (Construction)
Kevin Quinlan	Office of New Reactors	Meteorology and Air Quality
Stan Echols	Office of Nuclear Material Safety and Safeguards	Uranium Fuel Cycle; Radiological Waste
Edward Fuller	Office of New Reactors	Accidents
Michelle Hart	Office of New Reactors	Accidents
Kevin Witt	Office of Nuclear Material Safety and Safeguards	Transportation
Jessica Glenny	Office of Nuclear Material Safety and Safeguards	Transportation
Allen Fetter	Office of Federal and State Materials and Environmental Management Programs	Decommissioning

Name	Affiliation	Function or Expertise
Jim Shepherd	Office of Federal and State Materials and Environmental Management Programs	Decommissioning
U.S. ARMY CORPS OF ENGINEERS		
David Madden	Regulatory Branch, Forth Worth District	Section 404; Wetlands
OAK RIDGE NATIONAL LABORATORY (ORNL)[a]		
Gregory Zimmerman	Environmental Sciences Division	Team Leader
Barry Shumpert	Environmental Sciences Division	Land Use
Brennan Smith	Environmental Sciences Division	Hydrology
Ellen Smith	Environmental Sciences Division	Hydrology
Glenn Cada	Environmental Sciences Division	Hydrology/Water Quality
David Watson	Environmental Sciences Division	Hydrology /Geohydrology
Harry Quarles, III	Environmental Sciences Division	Terrestrial Ecology
James Saulsbury	Environmental Sciences Division	Socioeconomics; Environmental Justice
Keith Eckerman	Environmental Sciences Division	Health Physics; Human Health
Kathy Gant	Environmental Sciences Division	Health Physics; Human Health
Scott Ludwig	Global Nuclear Security Technology Division	Transportation
Kent Williams [b]	Nuclear Science & Technology Division	Uranium Fuel Cycle; Radiological Waste
Fred Peretz	Nuclear Science & Technology Division	Uranium Fuel Cycle; Radiological Waste; Decommissioning
David Bjornstad	Environmental Sciences Division	Benefit-Cost Analysis; Need for Power
Walter Koncinski	Creative Media Organization	Technical Editing
Priscilla Henson	Creative Media Organization	Technical Editing
INFORMATION SYSTEMS LABORATORIES, INC. (ISL)[c]		
Terry Gitnick	ISL	Project Manager
Steve Dillard	ISL/AECOM [d]	Aquatic Ecology
Steve Duda	ISL/AECOM [d]	Aquatic Ecology
Matt Goodwin	ISL/AECOM [d]	Cultural Resources
Susan Provenzano	ISL/AECOM [d]	Cultural Resources
Robert Dover	ISL/AECOM [d]	Meteorology/Air Quality; Alternatives
Ed Kaczmarczyk	ISL/AECOM [d]	Meteorology/Air Quality
Bruce Mrowca	ISL	Accidents
James Meyer	ISL	Accidents
Roberta Hurley	ISL/AECOM [d]	Alternatives
Kevin Taylor	ISL/AECOM [d]	Alternatives

a Oak Ridge National Laboratory is operated for the U.S. Department of Energy by UT-Battelle LLC.

b Retired from Oak Ridge National Laboratory.

c Information Systems Laboratories (ISL) is a private-sector company performing services under contract to NRC.

d AECOM is a private-sector subcontractor to ISL.

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Appendix B

Organizations Contacted

Appendix B

Organizations Contacted

The following Federal, State, regional, Tribal, and local organizations were contacted during the course of the U.S. Nuclear Regulatory Commission staff's independent review of potential environmental impacts from the construction and operation of two new nuclear units (Units 3 and 4) at the Comanche Peak Nuclear Power Plant site in Hood and Somervell Counties, Texas.

Advisory Council on Historic Preservation, Washington, D.C.

Apache Tribe of Oklahoma, Anadarko, Oklahoma

Toni Ballew, Director, Hood County United Way, Granbury, Texas

Caddo Nation of Oklahoma, Binger, Oklahoma

Cheyenne and Arapaho Tribes of Oklahoma, Concho, Oklahoma

City of Glen Rose, Texas, Betty Gosdin, Chair of City Planning and Zoning Commission

City of Granbury, Texas, David Southern, Mayor

City of Granbury, Texas, Harold Sandel, City Manager

City of Granbury, Texas, Ron Berryman, Assistant City Manager

City of Granbury, Texas, Lee Daniels, Chair of City Planning and Zoning Commission

Luis Crespo, Pastor, Maranatha Lighthouse Church, Glen Rose, Texas

Delaware Tribe of Oklahoma, Bartlesville, Oklahoma

The Delaware Nation, Delaware Tribe of Western Oklahoma, Anadarko, Oklahoma

Hood County, Texas, Andy Rash, County Judge

Hood County, Texas, Mike Sympson, County Commissioner

Kickapoo Traditional Tribe of Texas, Eagle Pass, Texas

National Marine Fisheries Service, St. Petersburg, Florida

Oncor Electric Delivery Company LLC, Dallas, Texas

Somervell County, Texas, Walter Maynard, County Judge

Somervell County, Texas, Mike Ford, County Commissioner

Somervell County, Texas, Susanne Reynolds, Emergency Management

Texas Parks and Wildlife Department, Wildlife Habitat Assessment Program, Austin, Texas

Texas State Historic Preservation Officer, Austin, Texas

U.S. Army Corps of Engineers, Fort Worth District, Fort Worth, Texas

U.S. Fish and Wildlife Service, Houston, Texas

Wichita and Affiliated Tribes, Anadarko, Oklahoma

Norma Wright, Volunteer, Hood County food pantry and other local charitable organizations, Granbury, Texas

Appendix C

Chronology of the Nuclear Regulatory Commission and the U.S. Army Corps of Engineers Staff Environmental Review Correspondence Related to Luminant Generation Company, LLC, Application for Combined Licenses at the Comanche Peak Nuclear Power Plant Site

Appendix C

Chronology of the Nuclear Regulatory Commission and the U.S. Army Corps of Engineers Staff Environmental Review Correspondence Related to Luminant Generation Company, LLC, Application for Combined Licenses at the Comanche Peak Nuclear Power Plant Site

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC) and Luminant Generation Company LLC (Luminant), and other correspondence related to the NRC staff's environmental review, under Title 10 of the Code of Federal Regulations (CFR) Part 51, for Luminant's application for combined licenses (COLs) at the Comanche Peak Nuclear Power Plant (CPNPP) in Somervell and Hood Counties, Texas. Additionally, correspondence related to the U.S. Army Corps of Engineers (USACE or Corps) environmental review of Luminant's application for two new units at the CPNPP site is also included. All documents, with the exception of those containing proprietary information, are available at the Commission's Public Document Room, at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, and are available electronically from the Public Electronic Reading Room found on the internet at the following web address: http://www.nrc.gov/reading-rm.html. From this site, the public can gain access to the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents in the component of ADAMS. The ADAMS accession numbers for each document are included below.

September 19, 2008	Letter from Mr. Mitch Lucas, Vice President, Luminant Generation Company LLC (Luminant), to the U.S. Nuclear Regulatory Commission (NRC), transmitting Combined License Application for Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML082680250).
November 3, 2008	Federal Register Notice of Receipt and Availability of Application of Combined License for Luminant Generation Company LLC (73 FR 66276) (Accession No. ML083010072).
November 3, 2008	Letter from Stephen Raul Monarque, NRC, to Mr. Don Woodlan, Manager, Luminant, transmitting Acknowledgement of Receipt of the Combined License Application for Comanche Peak Nuclear Power Plant,

	Units 3 and 4, and Associated Federal Register Notice (Accession No. ML082420365).
December 2, 2008	Federal Register Notice of Acceptance for Docketing of an Application for Combined License for Comanche Peak Nuclear Power Plant, Units 3 and 4 (73 FR 75141) (Accession No. ML083390640).
December 2, 2008	Letter from Stephen Raul Monarque, NRC, to Mr. Mitch Lucas, Luminant, transmitting Acceptance Review for the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application and Associated Federal Register Notice (Accession No. ML082420435).
December 9, 2008	Letter from Michael Willingham, NRC, to Ms. Peggy Oldham transmitting Maintenance of Reference Materials at the Somervell County Library Related to the Environmental Review of the Luminant Generation Company LLC Combined License Application at the Comanche peak Nuclear Power Plant Site (Accession No. ML083390652).
December 9, 2008	Letter from Michael Willingham, NRC, to Ms. Sheri McAllister transmitting Maintenance of Reference Materials at the Hood County Library Related to the Environmental Review of the Luminant Generation Company LLC Combined License Application at the Comanche peak Nuclear Power Plant Site (Accession No. ML083390662).
December 18, 2008	Letter from Mr. Mitch Lucas, Luminant, to Michael Willingham, NRC, transmitting Comanche Peak, Units 3 and 4, Reassessment of Proprietary Information (Accession No. ML083590296).
December 12, 2008	Federal Register Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process for the Comanche peak Nuclear Power Plant, Units 3 and 4 Combined License Application (73 FR 77076) (Accession No. ML090690659).
December 22, 2008	Memorandum to William Burton, NRC, from Michael Willingham, NRC, transmitting Notice of Public Meeting to Discuss Environmental Scoping Process for the Comanche Peak Nuclear Power Plant Combined License Application for Units 3 and 4 (TAC No. RF2683) (Accession No. ML083530985).
December 23, 2008	Letter from William Burton, NRC, to Mr. Lawerence Oaks, Executive Director, Texas State Historic Preservation Officer, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application Review (Accession No. ML083400507).

December 23, 2008	Letter from William Burton, NRC, to Ms. Kathy Boydston, Texas parks and Wildlife Department, transmitting Request for Participation in the Scoping Process and the List of State Listed Protected Species for the Environmental Review for the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083400514).
December 23, 2008	Letter from William Burton, NRC, to Mr. Don Klima, Director, Office of Federal Agency Programs, Advisory Council on Historic Preservation, transmitting Request for Participation in the Scoping Process for the Comanche peak Nuclear Power Plant, Units 3 and 4 Combined License Application Review (Accession No. ML083410002).
December 23, 2008	Letter from William Burton, NRC, to Mr. Tom Cloud, U.S. Fish and Wildlife Service, transmitting Request for Consultation and Participation in the Environmental Scoping Process and a List of Protected Species within the Area Under Evaluation for the Comanche peak Nuclear power Plant, Units 3 and 4 Combined License Application Review (Accession No. ML083450242).
December 23, 2008	Letter from William Burton, NRC, to Mr. David Bernhart, National Marine Fisheries Service, transmitting Request for Participation on the Environmental Scoping Process and a List of Protected Species and Habitat within the Area under Evaluation for Comanche Peak Units 3 and 4 Combined License Application Review (Accession No. ML083450284).
December 23, 2008	Letter from William Burton, NRC, to Governor Scott Miller, Absentee Shawnee Tribe Headquarters, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Plant, Units 3 and 4 Combined License Application (Accession No. ML083460276).
December 23, 2008	Letter from William Burton, NRC, to Chairman Ronnie Lupe, White Mountain Apache Tribe, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460284).
December 23, 2008	Letter from William Burton, NRC, to Bryant Celestine, Alabama-Coushatta Tribe of Texas, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460323).

December 23, 2008	Letter From William Burton, NRC, to Chairman Alonzo Chalepah, Apache Tribe of Oklahoma, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460347).
December 23, 2008	Letter from William Burton, NRC, to Chairwoman LaRue Parker, Caddo Nation of Oklahoma, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460378).
December 23, 2008	Letter from William Burton, NRC, to Governor Darrell Flyingman, Cheyenne and Arapaho Tribes of Oklahoma, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460400).
December 23, 2008	Letter from William Burton, NCR, to Chairman Wallace Coffey, Comanche Nation, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460416).
December 23, 2008	Letter from William Burton, NRC, to President Kerry Holton, Delaware Tribe of Western Oklahoma, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460442).
December 23, 2008	Letter from William Burton, NRC, to Chief Jerry Douglas, Delaware Tribe of Oklahoma, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460483).
December 23, 2008	Letter from William Burton, NRC, to Chairman Jeff Houser, Fort Sill Apache Tribe of Oklahoma, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460509).

December 23, 2008	Letter from William Burton, NRC, to Director Lorene Willis, Jicarilla Apache Nation, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460546).
December 23, 2008	Letter from William Burton, NRC, to Chairman Juan Garza, Jr., Kickapoo Traditional Tribe of Texas, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460577).
December 23, 2008	Letter from William Burton, NRC, to Chairman Billy Horse, Kiowa Tribe of Oklahoma, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460598).
December 23, 2008	Letter from William Burton, NRC, to President Carleton Naiche-Palmer, Mescalero Apache Tribe, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083460623).
December 23, 2008	Letter from William Burton, NRC, to President Leslie Standing, Wichita and Affiliated Tribes, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083470301).
December 23, 2008	Letter from William Burton, NRC, to Principal Chief Jim Roan Grey, Osage Nation, transmitting Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML083470322).
January 5, 2009	Letter from Mr. Donald L. Patterson, Tonkawa Tribe of Oklahoma, to the NRC transmitting reply to Environmental Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML090500590).
January 8, 2009	Letter from Mr. David Bernhart, National Marine Fisheries Service, to William Burton, NRC, transmitting response to the Nuclear Regulatory Commission (NRC) letter dated December 23, 2008 regarding the

	Comanche Peak Nuclear Power Plant near Glen Rose, Texas (Accession No. ML090230148).
January 30, 2009	Federal Register Notice - Comanche Peak Nuclear Power Plant, Units 3 and 4, Opportunity to Petition for Leave to Intervene and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards (74 FR 6177) (Accession No. ML090140359).
January 30, 2009	Letter from Stephen Raul Monarque, NRC, to Mr. Mitch Lucas, Luminant, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Opportunity to Petition for Leave to Intervene and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information and Safeguards Information for Contention Preparation (Accession No. ML083440401).
February 2, 2009	Memorandum from Michael Willingham, NRC, to William Burton, NRC, transmitting Summary of Public Scoping Meetings Related to the Combined License Application Review of the Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML090300226).
February 5, 2009	Press Release No. 09-023: NRC Announces Opportunity to Participate In Hearing On New Reactor Application For Comanche Peak Site In Texas (Accession No. ML090360555).
February 5, 2009	Letter from Mr. Mitch Lucas, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Joint Venture Announcement and Name Change of Nuclear Project Company LLC (Accession No. ML090540056).
February 13, 2009	Letter from Mr. Mitch Lucas, Luminant, to David Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Submittal of Golden-Cheeked Warbler Report (Accession No. ML090490382).
February 13, 2009	Letter from Mr. Mitch Lucas, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Update Regarding Proprietary Information and Submittal of Nuclear Power Plant Siting Report (Accession No. ML090490419).
February 13, 2009	Letter from Ms. Cathy Gilmore, Environmental Protection Agency, to Michael Lesar, NRC, transmitting Early Coordination Comanche Peak Nuclear Power Plant (Accession No. ML090680037).
February 16, 2009	Letter from Mr. Carter Smith, Texas Parks and Wildlife Department, to Michael Lesar, NRC, transmitting Comanche Peak, Units 3 and 4 Combined License Application Environmental Impact Statement (Accession No. ML090680387).

February 17, 2009	Letter from Ms. Charlene Dwin Vaughn, Advisory Council on Historic Preservation, to William Burton, NRC, transmitting reply to notification and request for consultation and participation in the scoping process for Units 3 and 4 Combined License Application Review for the Comanche Peak Nuclear Power Plant near Glen Rose, Texas (Accession No. ML090500077).
February 19, 2009	E-mail from Sean Patrick Edwards, U.S. Fish and Wildlife Service, to Michael Willingham, NRC, comments in regard to Units 3 and 4 Combined License Application Review for the Comanche Peak Nuclear Power Plant near Glen Rose, Texas (Accession No. ML092430749).
February 23, 2009	Letter from James Biggins, NRC, to Representative Lon Burnam, State of Texas, transmitting Response to Request for Access to Sensitive Unclassified Non-Safeguards Information Luminant Generation Company, LLC, Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML090550065).
February 23, 2009	Letter from James Biggins, NRC, to Mr. Robert Eye, Kaufman Eye, transmitting Response to Request for Access to Sensitive Unclassified Non-Safeguards Information Luminant Generation Company, LLC, Comanche Peak Nuclear Power Plant, Unit 3 and 4 (Accession No. ML090550232).
February 23, 2009	Letter from James Biggins, NRC, to Mr. Tom “Smitty” Smith and Mr. Matthew Johnson, Public Citizen, Texas Office, transmitting Response to Request for Access to Sensitive Unclassified Non-Safeguards Information Luminant Generation Company, LLC, Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML090550368).
March 10, 2009	Letter from Gregory P. Hatchett, NRC, to Mr. Stephen Brooks, U.S. Army Corps of Engineers (USACE), transmitting CPNPP Units 3 and 4, Invitation Ltr. to Participate as a Cooperating Agency in the NRC Staff's Preparation of an Environmental Impact Statement (Accession No. ML090140149).
March 31, 2009	Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Submittal of Documents to Facilitate Environmental Review (Accession No. ML091120524).
April 2, 2009	Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Submittal of Combined License Application Update Tracking Report, Revision 0 (Accession No. ML091120280).
April 15, 2009	Letter from Gregory P. Hatchett, NRC, to Mr. Don Woodlan, Luminant, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, COL

License Application Online Reference Portal (TAC RF2695) (Accession No. ML090890219).

April 15, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Submittal of Documents to Facilitate the Environmental Review (Accession No. ML091120279).

April 16, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Transmittal of Combined License Application Update Tracking Report, Rev. 1 (Accession No. ML091130575).

April 21, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Response to Conditions for Using an Online Reference Portal During the Review of Combined License Application (Accession No. ML091120717).

April 24, 2009 — Letter from Ms. Karen Hardin, Texas Parks and Wildlife Department, to Michael Lesar, NRC, transmitting Comanche Peak, Units 3 and 4 Combined License Application on Specific Yucca Species During Site Audit & Refined Data Regarding Known Occurrences of Rare Resources in Vicinity of Specific (Accession No. ML091310617).

April 27, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Submittal of Documents to Facilitate Environmental Review (Accession No. ML093290427).

April 28, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4 Combined License Application, Update Tracking Report (Accession No. ML091260719).

May 8, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Submittal of Document to Facilitate Environmental Review (Accession No. ML091320330).

May 14, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4 Combined License Application, Submittal of Update Tracking Report (Accession No. ML091400217).

May 27, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Submittal of Documents to Facilitate Environmental Review (Accession No. ML091490263).

June 26, 2009 — Letter from Michael Willingham, NRC, to Mr. Don Woodlan, Luminant, transmitting Request for Additional Information (RAI) Regarding the Environmental Review of the Combined License Application for

Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML091460707).

July 1, 2009 — Memorandum from Michael Willingham, NRC, to Gregory P. Hatchett, NRC, transmitting Scoping Summary Report Related to the Environmental Scoping Process for the CPNPP, Units 3 and 4, COL Application (Accession No. ML091390873).

July 20, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, First Partial Response to Request for Additional Information re the Environmental Review of the Combined License Application (Accession No. ML092090653).

July 24, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4 Combined License Application Update Tracking Report (Accession No. ML092090582).

July 27, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Second Partial Response to Request for Additional Information Regarding the Environmental Review of the Combined License Application (Accession No. ML092180066).

August 3, 2009 — Letter from John Fringer, NRC, to Mr. Don Woodlan, Luminant, transmitting RAI - Regarding the Environmental Review of the COL Application for Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML091970377).

August 10, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Final Partial Response to Request for Additional Information Regarding the Environmental Review of the Combined License Application (Accession No. ML092360142).

August 12, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Supplement to Final Partial Response to Request for Additional Information Regarding the Environmental Review of the Combined License Application of Comanche Peak Units 3 and 4 (Accession No. ML092290396).

August 28, 2009 — Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Supplemental Information for the Environmental Review RAI Questions SOC-09 through SOC-14 (Accession No. ML092440358).

September 1, 2009 — Memorandum from John Fringer, NRC, to Gregory P. Hatchett, NRC, transmitting 08/12/2009 Summary of Teleconference Held with Luminant

Generation Company LLC Regarding Requests for Additional Information (Accession No. ML092290018).

September 9, 2009 Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Supplemental Information for Environmental Review RAI Responses (Accession No. ML093080095).

September 14, 2009 Memorandum from Michael Willingham, NRC, to Gregory P. Hatchett, NRC, transmitting Trip Report - Ecology Site Audit and Alternative Sites Visit related to the Review of Luminant's Combined License Application for Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML091410721).

September 16, 2009 Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4, Supplemental Information for the Environmental Review RAI, Questions GEN-03, HYD-16, SOC-23, SOC-27, TE-04, TE-11, TE-15, TE-18, and TE-19 (Accession No. ML092640643).

October 9, 2009 Memorandum from John Fringer, NRC, to Gregory P. Hatchett, NRC, transmitting Summary of Teleconference Held with Luminant Generation Company LLC Regarding Requests for Additional Information (Accession No. ML092590369).

October 21, 2009 Letter from Mr. Rafael Flores, Luminant, to David Matthews, NRC, transmitting Comanche Peak, Units 3 and 4 Combined License Application Update Tracking Report (FSAR #7, ER #5) (Accession No. ML093020156).

December 4, 2009 Memorandum from Michael Willingham, NRC, to Gregory P. Hatchett, NRC, transmitting Summary of the Environmental Site Audit Related to the Review of the Luminant's Combined License Application for Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML092510499).

December 7, 2009 Memorandum from John Fringer, NRC, to Gregory P. Hatchett, NRC, transmitting Summary of August 20, 2009, Teleconferences held with Luminant Generation Company LLC regarding Requests for Additional Information (Accession No. ML092880235).

December 8, 2009 Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application Part 3, Environmental Report, Revision 1, Update Tracking Report Revision 0 (Accession No. ML093440179).

December 18, 2009 Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Supplemental

		Information in Response to the Request for Additional Information Regarding the Environmental Review (Accession No. ML093620032).
	January 15, 2010	Letter from Michael Willingham, NRC, to Mr. Don Woodlan, Luminant, transmitting Request for Additional Information Regarding the Environmental Review of the COL Application for CPNPP, Units 3 and 4 (Accession No. ML093280707).
	January 15, 2010	Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, COL Application Part 3, Environmental Report, Update Tracking Report (Accession No. ML100191529).
	January 19, 2010	Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Corrections for COL Application Part 3, Environmental Report, Update Tracking Report (Accession No. ML100210301).
	January 19, 2010	Letter from Dave Matthews, NRC, to Rafael Flores, Luminant, transmitting Combined License Application Environmental Review Schedule for Comanche Peak Nuclear Power Plant, Units 3 and 4 (Accession No. ML100260655).
	February 24, 2010	Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Response to Request for Additional Information Regarding the Environmental Review and Supplemental Information for Previous Environmental Questions (Accession No. ML100630660).
	March 3, 2010	Letter from Gregory P. Hatchett, NRC, to Donald Woodlan, Luminant, transmitting NRC Staff Clarification for the Environmental Impact of the Blow-down Treatment Facility Proposed in the Comanche Peak Nuclear Power Plant, Units 3 and 4 Combined License Application (Accession No. ML100500642).
	March 3, 2010	Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, COL Application Part 3, Environmental Report, Update Tracking Report Revision 3 (Accession No. ML100640170).
	March 5, 2010	Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Response to Environmental Review Questions ALT-03 and SOC-33, and Supplemental Information for Question TE-04 (Accession No. ML100710613).

March 9, 2010 — Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Supplemental Information for Environmental Review Requests for Additional Information HYD-11, HYD-18, and HYD-19 (Accession No. ML100710027).

March 19, 2010 — Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Supplemental Information for Responses to Environmental Review Request for Additional Information GEN-03 and GEN-07 (Accession No. ML100820402).

April 12, 2010 — Letter from Rafael Flores, Luminant, to Dave Matthews, NRC, transmitting Comanche Peak Nuclear Power Plant, Units 3 and 4, Unclassified Change to Physical Security Plan Due to Squaw Creek Reservoir Opening (Accession No. ML101040261).

Appendix D

Scoping Comments and Responses

Appendix D

Scoping Comments and Responses

On December 12, 2008, the U.S. Nuclear Regulatory Commission (NRC) published a Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process in the *Federal Register* (73 FR 77076-8). The Notice of Intent notified the public of the staff's intent to prepare an environmental impact statement (EIS) and conduct scoping for the combined license (COL) application received from Luminant Generation Company LLC (Luminant), acting for itself and as agent for Nuclear Project Company LLC, for 2 units, identified as Comanche Peak Nuclear Power Plant (CPNPP) Units 3 and 4, to be located adjacent to the existing CPNPP Units 1 and 2, located approximately 40 mi southwest of Fort Worth, Texas. This EIS has been prepared in accordance with provisions of the National Environmental Policy Act of 1969 (NEPA), Council on Environmental Quality guidelines, and Title 10 of the Code of Federal Regulations (CFR) Parts 51 and 52. As outlined by NEPA, the NRC initiated the scoping process with the issuance of the *Federal Register* Notice. The NRC invited the applicant; Federal, Tribal, State, and local government agencies; local organizations; and individuals to participate in the scoping process by providing oral comments at the scheduled public meeting and/or submitting written suggestions and comments no later than February 17, 2009.

D.1 Overview of the Scoping Process

The scoping process provides an opportunity for public participation to identify issues to be addressed in the EIS and to highlight public concerns and issues. The notice of intent identified the following objectives of the scoping process:

- Define the proposed action that is to be the subject of the EIS.
- Determine the scope of the EIS and identify significant issues to be analyzed in depth.
- Identify and eliminate from detailed study those issues that are peripheral or that are not significant.
- Identify any environmental assessments and other EISs that are being prepared or will be prepared that are related to, but not part of, the scope of the EIS being considered.
- Identify other environmental review and consultation requirements related to the proposed action.
- Identify parties consulting with the NRC under the National Historic Preservation Act (NHPA), as set forth in 36 CFR 800.8(c)(1)(i).
- Indicate the relationship between the timing of the preparation of the environmental analyses and the NRC's tentative planning and decision-making schedule.
- Identify any cooperating agencies and, as appropriate, allocate assignments for preparation and schedules for completing the EIS to the NRC and any cooperating agencies. By letter dated April 21, 2009, the U.S. Army Corps of Engineers (USACE) accepted the NRC's invitation to participate as a cooperating agency on the CPNPP Units 3 and 4 COL application environmental review.
- Describe how the EIS will be prepared, and identify any contractor assistance to be used.

Two public scoping meetings were held at the Glen Rose Expo Center, in Glen Rose, Texas, on January 6, 2009. The NRC announced the meetings in local and regional newspapers (*Glen Rose Newspaper*, *Hood County News*, and *Fort Worth Star-Telegram*) and issued press

releases locally. Approximately 110 people attended the afternoon scoping meeting and approximately 50 attended the evening session. The scoping meetings began with NRC staff members providing a brief overview of NRC's review process for COL applications and the NEPA process. After the NRC's prepared statements, the meetings were opened for public comments.

Twenty-five (25) afternoon scoping meeting attendees and 26 evening scoping meeting attendees provided oral comments that were recorded and transcribed by a certified court reporter. Twelve (12) written statements were received during the meeting. In addition to the oral and written statements provided at the public scoping meeting, 2 letters and 30 e-mail messages were received during the scoping period.

Transcripts for both afternoon and evening scoping meetings can be found in ADAMS under accession numbers ML090290409 and ML090291005, respectively. A scoping meeting summary memorandum (ML090300226) was issued February 2, 2009.

At the conclusion of the scoping period, the NRC staff reviewed the scoping meeting transcripts and all written material received during the comment period and identified individual comments. These comments were organized according to topic within the proposed EIS or according to the general topic, if outside the scope of the EIS. Once comments were grouped according to subject area, the staff determined the appropriate response for the comment. The staff made a determination on each comment that it was one of the following:

- A comment that was actually a question and introduced no new information.
- A comment that was either related to support or opposition of combined licensing in general (or specifically the Comanche Peak Unit 3 and 4 COL) or that made a general statement about the COL process. In addition, it provided no new information and did not pertain to 10 CFR Part 52.
- A comment about an environmental issue that
  - provided new information that would require evaluation during the review
  - provided no new information.
- A comment that was outside the scope of the COL, which included, but was not limited to
  - a comment on the safety of the existing units.

Preparation of the EIS has taken into account the relevant issues raised during the scoping process. The comments received on the draft EIS will be considered in the preparation of the final EIS. The final EIS, along with the staff's Safety Evaluation Report (SER), will provide much of the basis for the NRC's decision on whether to grant the Comanche Peak Unit 3 and 4 COL.

The comments related to this environmental review are included in this appendix. They were extracted from the *Specific Plant Combined License Scoping Summary Report (ML091390849)*, and are provided for convenience of those interested specifically in the scoping comments applicable to this environmental review. The comments that are outside the scope of the environmental review for the proposed Comanche Peak Units 3 and 4 are not included in this Appendix. These include comments related to:

- Safety
- Emergency Preparedness
- NRC Oversight for operating plants
- Security and Terrorism

- Support or Opposition to the licensing action, licensing process, nuclear power, hearing process or the existing plant

More detail regarding the disposition of general or out of scope comments can be found in the Scoping Summary Report (ML091390849). To maintain consistency with the Scoping Summary Report, the comment source ID and comment number along with the name of the commenter used in that report is retained in this appendix.

Table D-1 identifies in alphabetical order the individuals providing comments during the scoping period, their affiliation, if given, and the ADAMS accession number that can be used to locate the correspondence. Although all commenters are listed, the comments presented in this appendix are limited to those within the scope of the environmental review. Table D-2 lists the comment categories in alphabetical order and commenter names and comment numbers for each category. The balance of this appendix presents the comments themselves with NRC staff responses organized by topic category.

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Table D-1. Individuals Providing Comments During the Comment Period

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID Number
Atkinson, Bill	Glen Rose Chamber of Commerce	Meeting Transcript (ML090290409)	0016
Bahlburg, Kelly	Self	Email (ML090230174)	0013
Bernhart, David	NOAA, National Marine Fisheries Service	Email (ML090230148)	0003
Bernier, Jim	Self	Email (ML090300670)	0020
Berry, Steve	Hood County	Meeting Transcript (ML090290409)	0016
Bisbee, Kay	Self	Meeting Transcript (ML090291005)	0017
Boydston, Kathy	Texas Parks and Wildlife Department	Email (ML090490221)	0029
Burnam, Lon	Texas Legislature	Meeting Transcript (ML090290409)	0016
Burnam, Lon	Texas Legislature	Meeting Transcript (ML090291005)	0017
Cathey, Jack	Self	Meeting Transcript (ML090260390)	0018
Cathey, Jack	Self	Meeting Transcript (ML090290409)	0016
Chorost, Amy	Self	Email (ML090230169)	0012
Cohn, Ann	Self	Meeting Transcript (ML090291005)	0017
Downing, Kevin	Self	Meeting Transcript (ML090291005)	0017
Drechel, Gary	Self	Email (ML090230155)	0007
Duck, Kathy	Self	Email (ML090230157)	0009
Duncan, Jim	North Texas Renewable Energy	Meeting Transcript (ML090291005)	0017
Duvall-Gabriel, Najah	Advisory Council on Historic Preservation	Email (ML090500077)	0036
Edwards, Chet	U.S. House of Representatives	Meeting Transcript (ML090260371)	0019
English, Maurice	Self	Meeting Transcript (ML090290409)	0016
Gentling, Suzanne	Self	Email (ML090490226)	0031

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Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID Number
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Email (ML090230176)	0014
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Email (ML09049231)	0033
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Email (ML090480025)	0022
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Email (ML090490224)	0030
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Meeting Transcript (ML090260371)	0019
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Meeting Transcript (ML090290409)	0016
Hadden, Karen	Sustainable Energy & Economic Development (SEED) Coalition	Meeting Transcript (ML090291005)	0017
Hale, Rod	Self	Meeting Transcript (ML090290409)	0016
Harper, Debbie	Self	Meeting Transcript (ML090291005)	0017
Harper, Paul	Glen Rose Network Corp.	Meeting Transcript (ML090291005)	0017
Hind, Rebecca	Nuclear Energy for Texans (NET)	Meeting Transcript (ML090260390)	0018
Illegible, Illegible	Tokawa Tribe of Oklahoma	Letter (ML090500590)	0037
Independent School District, Glen Rose	Self	Meeting Transcript (ML090260371)	0019
Inge, Charles and Dominique	Self	Email (ML090490218)	0028
Johnson, Lisa	City of Granbury	Meeting Transcript (ML090290409)	0016
Kinzie, W.T.	Self	Meeting Transcript (ML090290409)	0016
Leising, Joe	Self	Meeting Transcript (ML090291005)	0017
Lowe, Ed	Friends of the Brazos River	Email (ML090480028)	0025
Luton, John Henry	First National Bank of Granbury	Email (ML090230149)	0004
Marks, Gary	Glen Rose Medical Center	Meeting Transcript (ML090290409)	0016
Maynard, Walter	Somervell County Commissioners Court	Meeting Transcript (ML090290409)	0016

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Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID Number
Maynard, Walter	Somervell County Commissioners Court	Meeting Transcript (ML090291005)	0017
Mayo, Ann B.	Self	Email (ML090480029)	0026
Meyers, Kevin	Self	Meeting Transcript (ML090290409)	0016
Miller, Pam	Glen Rose	Meeting Transcript (ML090291005)	0017
Miller, Russ	Chalk Mountain Wildlife Management Association; Light Pollution Committee	Email (ML090480030)	0024
Norton, Barbara & Tom	Self	Letter (ML090500381)	0038
Orcutt, David	Lake Granbury Medical Center	Meeting Transcript (ML090260390)	0018
Orcutt, David	Lake Granbury Medical Center	Meeting Transcript (ML090290409)	0016
Osowski Morgan, Sharon L.	U.S. Environmental Protection Agency	Email (ML090480031)	0027
Otte, Melinda	Comanche Peak WIN chapter	Email (ML090230168)	0011
Overstreet, Lee	Granbury Rotary Club	Meeting Transcript (ML090290409)	0016
Phillips, Marilyn	Somervell School District	Meeting Transcript (ML090290409)	0016
Phillips, Marilyn	Somervell School District	Meeting Transcript (ML090291005)	0017
Ramsey, Terry	Self	Email (ML090230152)	0006
Rash, Andy	Hood County Commissioners Court	Meeting Transcript (ML090290409)	0016
Rash, Andy	Hood County Commissioners Court	Meeting Transcript (ML090291005)	0017
Reed, Cyrus	Lone Star Chapter of the Sierra Club	Email (ML09040228)	0032
Reed, Cyrus	Lone Star Chapter of the Sierra Club	Email (ML090490228)	0035
Reed, Cyrus	Lone Star Chapter of the Sierra Club	Meeting Transcript (ML090290409)	0016
Richardson, Karen	Self	Email (ML090430065)	0021
Rittenhouse, Ryan	Public Citizen	Meeting Transcript (ML090291005)	0017

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Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID Number
Roan, Richard	Self	Meeting Transcript (ML090260390)	0018
Roan, Richard	Self	Meeting Transcript (ML090290409)	0016
Rooke, Molly	Self	Meeting Transcript (ML090291005)	0017
Rosenfeld, Joshua	Brazos River Conservation Commission	Meeting Transcript (ML090290409)	0016
Sanders, Jan	Self	Meeting Transcript (ML090291005)	0017
Scott, Mike	Granbury Chamber of Commerce	Meeting Transcript (ML090260371)	0019
Scott, Mike	Granbury Chamber of Commerce	Meeting Transcript (ML090290409)	0016
Shaar, Julie	Self	Meeting Transcript (ML090290409)	0016
Sheaks, Jerry	Self	Meeting Transcript (ML090291005)	0017
Shroyer, Danielle	Self	Email (ML090230167)	0010
Smith, Hugh	Self	Meeting Transcript (ML090290409)	0016
Smith, Tom	Texas Office of Public Citizen	Email (ML090210450)	0002
Spears, Linda	Self	Email (ML090230177)	0015
Stamler, Richard	Self	Email (ML090230156)	0008
Stuard, Gary	Interfaith Environmental Alliance	Meeting Transcript (ML090291005)	0017
Sumners, Allen	Self	Meeting Transcript (ML090291005)	0017
Sykes, Victoria	Congressman Chet Edward's Office	Meeting Transcript (ML090290409)	0016
Taylor, Kevin	Somervell County Water District	Meeting Transcript (ML090290409)	0016
Ubico, Jean	Self	Email (ML090480027)	0023
Ward, Mary	Granbury-Hood County Economic Development Corporation	Meeting Transcript (ML090290409)	0016

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Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID Number
Wildwood, Kathleen	Self	Meeting Transcript (ML090290409)	0016
Wohler, Will	Self	Meeting Transcript (ML090260390)	0018
Wohler, Will	Self	Meeting Transcript (ML090291005)	0017
Wolz, Conrad	Trophy Club Texas	Email (ML090230150)	0005
Wyatt, Dr. Bill	Self	Meeting Transcript (ML090291005)	0017

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Table D-2. Comment Categories with Associated Commenters and Comment IDs

Comment Category	Commenter (Comment ID)
Accidents-Design Basis	• Gentling, Suzanne (0031-6) • Hadden, Karen (0017-26) (0022-47) (0022-54) • Osowski Morgan, Sharon L. (0027-4) • Reed, Cyrus (0032-10)
Accidents-Severe	• Burnam, Lon (0016-41) • Hadden, Karen (0019-11) (0022-28) (0022-45) • Harper, Debbie (0017-51) • Reed, Cyrus (0032-11)
Alternatives-Energy	• Bisbee, Kay (0017-47) • Burnam, Lon (0017-16) • Cohn, Ann (0017-34) (0017-37) • Duncan, Jim (0017-53) • Hadden, Karen (0016-12) (0016-14) (0016-15) (0016-17) (0016-19) (0016-20) (0019-7) (0022-5) (0022-48) (0022-49) (0022-50) (0022-51) (0030-2) (0030-7) • Osowski Morgan, Sharon L. (0027-3) • Reed, Cyrus (0016-51) (0032-14) (0032-15) (0032-17) • Rittenhouse, Ryan (0017-61) • Sanders, Jan (0017-73) • Shaar, Julie (0016-76) • Shroyer, Danielle (0010-2) • Stuard, Gary (0017-79) • Wildwood, Kathleen (0016-61) • Wohler, Will (0017-59) (0018-3)
Alternatives-No-Action	• Wohler, Will (0017-58)
Alternatives-System Design	• Hadden, Karen (0022-19) (0022-41) • Lowe, Ed (0025-2) • Miller, Russ (0024-1) • Osowski Morgan, Sharon L. (0027-6) (0027-8) (0027-11) • Reed, Cyrus (0032-12)

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Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Benefit-Cost Balance	• Gentling, Suzanne (0031-8) • Hadden, Karen (0019-8) (0030-1) • Harper, Debbie (0017-50) • Osowski Morgan, Sharon L. (0027-24) (0027-26) • Richardson, Karen (0021-3) • Sanders, Jan (0017-81) • Stuard, Gary (0017-77) • Ubico, Jean (0023-7)
2 Cumulative Impacts	• Burnam, Lon (0016-37) • Cathey, Jack (0016-65) • Hadden, Karen (0022-24) (0022-27) • Osowski Morgan, Sharon L. (0027-25) • Reed, Cyrus (0032-9) • Rittenhouse, Ryan (0017-64) (0017-65) • Stuard, Gary (0017-78)
Decommissioning	• Burnam, Lon (0016-38) • Hadden, Karen (0022-16) (0022-17) (0022-39) • Inge, Charles and Dominique (0028-3) • Reed, Cyrus (0032-18)
Ecology-Aquatic	• Bernier, Jim (0020-2) • Boydston, Kathy (0029-1) (0029-3) (0029-5) (0029-16) (0029-17) (0029-18) (0029-19) • Burnam, Lon (0016-43) (0017-18) • Cathey, Jack (0016-64) (0018-5) (0018-7) • Gentling, Suzanne (0031-3) • Hadden, Karen (0019-12) (0022-8) (0022-11) (0022-13) (0022-18) (0022-21) • Kinzie, W.T. (0016-69) • Lowe, Ed (0025-1) • Osowski Morgan, Sharon L. (0027-10) (0027-21) • Reed, Cyrus (0032-7)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Ecology-Terrestrial	• Boydston, Kathy (0029-2) (0029-6) (0029-7) (0029-8) (0029-9) (0029-10) (0029-11) (0029-12) (0029-13) (0029-14) (0029-15) (0029-21) (0029-22) (0029-23) (0029-24) (0029-25) • Hadden, Karen (0022-14) • Miller, Russ (0024-2) • Osowski Morgan, Sharon L. (0027-7) (0027-22) (0027-23)
Environmental Justice	• Hadden, Karen (0019-25) • Osowski Morgan, Sharon L. (0027-20)
Geology	• Hadden, Karen (0019-22) (0022-9)
Health-Radiological	• Burnam, Lon (0016-39) (0017-10) (0017-14) (0017-17) • Gentling, Suzanne (0031-4) • Hadden, Karen (0016-21) (0016-22) (0016-25) (0019-9) (0019-10) (0019-15) (0019-27) (0022-7) (0022-12) (0022-15) (0022-26) (0022-29) (0022-30) (0022-35) (0022-36) (0022-37) (0022-38) (0022-40) • Osowski Morgan, Sharon L. (0027-5) • Reed, Cyrus (0016-53) (0016-54) (0032-8) • Rittenhouse, Ryan (0017-62) • Rooke, Molly (0017-38) (0017-39) • Sanders, Jan (0017-69) (0017-71)
Historic and Cultural Resources	• Duvall-Gabriel, Najah (0036-1) • Illegible, Illegible (0037-1) • Osowski Morgan, Sharon L. (0027-19)
Hydrology-Groundwater	• Cohn, Ann (0017-35) • Hadden, Karen (0019-13) (0019-14) (0019-28) • Kinzie, W.T. (0016-66) • Osowski Morgan, Sharon L. (0027-15) (0027-16) • Richardson, Karen (0021-2) • Rooke, Molly (0017-40) (0017-43)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Hydrology-Surface Water	• Bernier, Jim (0020-1) • Berry, Steve (0016-28) • Burnam, Lon (0016-42) • Cathey, Jack (0016-63) (0018-4) (0018-6) • Gentling, Suzanne (0031-2) • Hadden, Karen (0016-23) (0019-16) (0019-17) (0019-31) (0019-32) (0022-6) (0022-10) (0022-20) (0022-22) (0022-55) (0030-5) • Inge, Charles and Dominique (0028-1) (0028-2) • Kinzie, W.T. (0016-62) (0016-68) • Osowski Morgan, Sharon L. (0027-9) (0027-12) (0027-13) (0027-14) • Reed, Cyrus (0016-52) (0032-5) (0032-6) • Richardson, Karen (0021-1) • Rooke, Molly (0017-41) (0017-42) • Rosenfeld, Joshua (0016-79) • Sanders, Jan (0017-66) (0017-72) • Stamler, Richard (0008-1) • Stuard, Gary (0017-76)
Land Use-Site and Vicinity	• Luton, John Henry (0004-3)
Land Use-Transmission Lines	• Hadden, Karen (0019-24)
Meteorology and Air Quality	• Osowski Morgan, Sharon L. (0027-18)

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Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Need for Power	• Burnam, Lon (0017-11) (0017-15) • Hadden, Karen (0016-13) (0019-21) (0030-8) • Reed, Cyrus (0016-50) (0032-16) • Bisbee, Kay (0017-46) • Cohn, Ann (0017-33) • Gentling, Suzanne (0031-1) • Harper, Debbie (0017-52) • Mayo, Ann B. (0026-3) • Stuard, Gary (0017-74) • Burnam, Lon (0016-45) • Hadden, Karen (0016-10) (0017-19) (0017-20) (0017-21) (0017-22) (0017-23) (0017-24) (0017-25) (0019-29) (0022-1) (0022-2) • Harper, Debbie (0017-49) • Mayo, Ann B. (0026-2) • Reed, Cyrus (0016-48) (0016-56) (0032-1) (0032-2) • Duncan, Jim (0017-54) • Hadden, Karen (0016-11) (0019-6) • Mayo, Ann B. (0026-1) • Reed, Cyrus (0016-49) • Rittenhouse, Ryan (0017-60) • Shroyer, Danielle (0010-1) • Wolz, Conrad (0005-1) • Berry, Steve (0016-27) • Burnam, Lon (0017-13) • Downing, Kevin (0017-31) • Hadden, Karen (0019-18) (0019-19) (0019-20) (0022-46) • Inge, Charles and Dominique (0028-4) • Maynard, Walter (0017-6) • Norton, Barbara & Tom (0038-2) • Hadden, Karen (0022-52) • Inge, Charles and Dominique (0028-5) • Smith, Tom (0002-1) • Hadden, Karen (0017-27) (0022-42) • Shroyer, Danielle (0010-4) • Hadden, Karen (0030-3) • Burnam, Lon (0016-36) • Hadden, Karen (0017-28) (0019-33) (0022-33) (0022-53) (0030-4) • Inge, Charles and Dominique (0028-6) • Kinzie, W.T. (0016-67) • Reed, Cyrus (0032-13) • Shroyer, Danielle (0010-3)

Table D-2. (contd)

	Comment Category	Commenter (Comment ID)
1	Process-NEPA	• Chorost, Amy (0012-1) • Downing, Kevin (0017-30) • Osowski Morgan, Sharon L. (0027-1) (0027-2) (0027-27)
	Site Layout and Design	• Boydston, Kathy (0029-4) • Osowski Morgan, Sharon L. (0027-17) • Rooke, Molly (0017-44) • Ubico, Jean (0023-2) (0023-3) (0023-4) (0023-5) (0023-6)

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Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Socioeconomics	• Boydston, Kathy (0029-20) • Burnam, Lon (0017-12) • Drechel, Gary (0007-1) • Hadden, Karen (0019-23) (0022-23) • Johnson, Lisa (0016-3) • Kinzie, W.T. (0016-70) • Luton, John Henry (0004-4) • Miller, Pam (0017-1) • Miller, Russ (0024-3) • Rosenfeld, Joshua (0016-78) • Sheaks, Jerry (0017-56) • Ubico, Jean (0023-1) • Ward, Mary (0016-32) • Atkinson, Bill (0016-47) • Bahlburg, Kelly (0013-1) • Berry, Steve (0016-26) (0016-29) • Downing, Kevin (0017-32) • Duck, Kathy (0009-1) • English, Maurice (0016-74) • Hind, Rebecca (0018-8) • Independent School District, Glen Rose (0019-2) • Johnson, Lisa (0016-2) • Leising, Joe (0017-55) • Luton, John Henry (0004-2) • Marks, Gary (0016-59) • Maynard, Walter (0016-5) (0017-5) • Meyers, Kevin (0016-46) • Miller, Pam (0017-2) • Norton, Barbara & Tom (0038-1) • Orcutt, David (0016-72) (0018-2) • Overstreet, Lee (0016-62) • Phillips, Marilyn (0016-31) (0017-9) • Ramsey, Terry (0006-1) • Rash, Andy (0016-7) (0016-9) (0017-7) • Roan, Richard (0016-6) (0018-1) • Scott, Mike (0016-34) (0019-3) • Sheaks, Jerry (0017-57) • Smith, Hugh (0016-77) • Sumners, Allen (0017-80) • Sykes, Victoria (0016-57) • Taylor, Kevin (0016-35)

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Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Ward, Mary (0016-33) • Wyatt, Dr. Bill (0017-29) • Edwards, Chet (0019-1) • Spears, Linda (0015-1) • English, Maurice (0016-73) • Hale, Rod (0016-71) • Johnson, Lisa (0016-1) • Luton, John Henry (0004-1) • Marks, Gary (0016-58) • Maynard, Walter (0016-4) (0017-4) • Miller, Pam (0017-3) • Phillips, Marilyn (0016-30) (0017-8) • Rash, Andy (0016-8)
Transportation	• Gentling, Suzanne (0031-7)
Uranium Fuel Cycle	• Burnam, Lon (0016-40) (0016-44) • Cohn, Ann (0017-36) • Gentling, Suzanne (0031-5) • Hadden, Karen (0016-16) (0016-18) (0016-24) (0019-26) (0019-30) (0022-3) (0022-4) (0022-25) (0022-31) (0022-32) (0022-34) (0022-43) (0022-44) (0030-6) • Harper, Paul (0017-48) • Reed, Cyrus (0016-55) (0032-3) (0032-4) • Rittenhouse, Ryan (0017-63) • Rooke, Molly (0017-45) • Sanders, Jan (0017-67) (0017-68) (0017-70) • Shaar, Julie (0016-75) • Stuard, Gary (0017-75) • Wildwood, Kathleen (0016-60)

D.2 In-Scope Comments and Responses

The in-scope comment categories are listed alphabetically in Table D-3 in the order that they are presented in this EIS. In-scope comments and responses are included below the table. Parenthetical numbers shown after each comment refer to the Comment Identification (ID) number (document number-comment number) and the commenter name.

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Table D-3. Comment Categories in Order as Presented in This Report

D.2.2 Comments Concerning Process - NEPA
D.2.3 Comments Concerning Site Layout and Design
D.2.4 Comments Concerning Land Use - Site and Vicinity
D.2.5 Comments Concerning Land Use - Transmission Lines
D.2.6 Comments Concerning Meteorology and Air Quality
D.2.7 Comments Concerning Geology
D.2.8 Comments Concerning Hydrology - Surface Water
D.2.9 Comments Concerning Hydrology - Groundwater
D.2.10 Comments Concerning Ecology - Terrestrial
D.2.11 Comments Concerning Ecology - Aquatic
D.2.12 Comments Concerning Socioeconomics
D.2.13 Comments Concerning Historic and Cultural Resources
D.2.14 Comments Concerning Environmental Justice
D.2.16 Comments Concerning Health - Radiological
D.2.17 Comments Concerning Accidents - Design Basis
D.2.18 Comments Concerning Accidents - Severe
D.2.19 Comments Concerning the Uranium Fuel Cycle
D.2.20 Comments Concerning Transportation
D.2.21 Comments Concerning Decommissioning
D.2.23 Comments Concerning Cumulative Impacts
D.2.25 Comments Concerning the Need for Power
D.2.26 Comments Concerning Alternatives - No-Action
D.2.27 Comments Concerning Alternatives - Energy
D.2.28 Comments Concerning Alternatives - System Design
D.2.30 Comments Concerning Benefit - Cost Balance

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D.2.2 Comments Concerning Process - NEPA

Comment: Please seriously consider environmental impact when deciding on the two new reactors proposed for the Comanche Peak site. (**0012-1** [Chorost, Amy])

Response: *The NRC Staff is considering the potential environmental impacts of the proposed licensing action. An explanation of the NRC's approach to evaluating and documenting environmental impacts is available in Title 10 of the Code of Federal Regulations, Part 51.*

Comment: I think that with the due diligence that is represented by the people in this room, by the due diligence of the people that I know at the plant.

You have heard of Bruce Turner's name tonight several times. I have a lot of faith and confidence in that gentleman, and in other people like him that work for Luminant. Environmental impact studies need to happen. (**0017-30** [Downing, Kevin])

Response: *This comment provides no information related to the scope of this EIS and will therefore not be considered further in the staff's environmental review.*

Comment: The need for the project should be clearly stated, as well as potential benefits and adverse effects of the proposed project. Project impacts and impact mitigation are evaluated in the context of project need. (**0027-1** [Osowski Morgan, Sharon L.])

Response: *The purpose and need for the proposed power plant will be explained in Section 1.3 of the EIS. The impacts and alternatives will be evaluated in the context for the project need.*

Comment: The analysis of alternatives is the core of the NEPA process. The forthcoming Environmental Impact Statement (EIS) should include a minimum of two feasible action alternatives to be fully considered, as well as the No-Action Alternative.

A rationale for rejecting certain alternatives from further consideration should be provided. The rationale should include environmental reasons, along with other considerations. The selected alternative should avoid/minimize adverse impacts, so that the need for mitigation of impacts will be lessened or eliminated. A critical factor of the alternatives analysis is the avoidance/minimization of adverse impacts. (**0027-2** [Osowski Morgan, Sharon L.])

Response: *Analysis of alternatives is at the heart of the NEPA process. Chapter 9 of the EIS will evaluate appropriate alternatives to the proposed action and explain why other alternatives were not examined in detail. Mitigation measures will be examined and addressed as appropriate in Chapters 4 and 5 of the EIS.*

Comment: There is no mention of CPNPP participation in EPA's Performance Track Program or whether CPNPP has an Environmental Management System (EMS) in place. The Council on Environmental Quality (CEQ) published Aligning NEPA processes with Environmental management Systems-A Guide for NEPA and EMS Practitioners to improve NEPA implementation and environmental sustainability goals in NEPA and Executive Order 13423. The NEPA document should discuss EMS as appropriate. (**0027-27** [Osowski Morgan, Sharon L.])

Response: *Although the NRC does not require nuclear power plants to employ an environmental management system (EMS), the NRC will evaluate whether or not Luminant has developed an EMS and its use in the development of the environmental report in Section 3.3 of the EIS.*

D.2.3 Comments Concerning Site Layout and Design

Comment: do you know what would happen when the ambient temperature becomes too high, and the water temperature becomes too high for the plant to operate safely? And when that happens, do you have plans in place? Do you know what would happen at that point?

(**0017-44** [Rooke, Molly])

Response: *Section 3.3.2.2 of the EIS will explain what changes to plant operations would be initiated in response to unusually high ambient temperatures. At minimum, plant power would be reduced to ensure continued safe plant operation within the constraint of the available cooling capacity. Analyses for the EIS and/or environmental regulator requirements may also lead to additional constraints on plant power to protect environmental resources.*

Comment: How long are spent rods from nuclear waste stored in temporary pools from the existing Comanche Peak reactor? (**0023-2** [Ubico, Jean])

Comment: How many pounds of nuclear waste presently exist in the temporary storage bins at Comanche Peak? (**0023-3** [Ubico, Jean])

Comment: How much additional nuclear waste will be generated as the nuclear reactor ages? (**0023-5** [Ubico, Jean])

Comment: What is the long-term plan for disposal of nuclear waste at Comanche Peak? (**0023-6** [Ubico, Jean])

Response: *Section 3.3.3 of the EIS will describe radioactive waste management activities associated with operation of the proposed units. The environmental impacts of waste management activities will be discussed in Chapter 6 of the EIS.*

Comment: How much additional waste will be generated per day by the proposed construction of the two additional reactors? (**0023-4** [Ubico, Jean])

Comment: Chapter 3 -Plant Description

The ER does not provide details of the site plan for the blowdown treatment facility (BDTF) other than large blocks showing the proposed location. The February 2, 2009 site visit indicated that several ponds of unknown size, shape or location would be constructed within this area. Power transmission lines were observed in the area.

Comment: The size, shape, and location of the BDTF ponds relative to the transmission lines need to be revealed in a site plan drawing. (**0029-4** [Boydston, Kathy])

Response: *Plant construction will be described in Section 3.3 of the EIS. The plant description will include details requested in the comments.*

Comment: The ER does not provide much information on meeting the requirements of the Resource Conservation and Recovery Act (RCRA). Clarification on RCRA permitting of Units 3 and 4, hazardous waste satellite accumulation areas, and storage times (i.e., greater than 90 days) is requested.

The contaminant monitoring list seems too narrow. We recommend reviewing site operations, wastes, chemical storage and use, etc. to determine appropriateness of including other contaminants on list. The constituents of concern (COC's) should reflect the actual constituents and their daughter or degradation products that are being utilized by CPNPP.

The information on solid waste management should be expanded. Discussion should include summary of how groundwater monitoring will include all RCRA wastes and any potential solid waste management units. (**0027-17** [Osowski Morgan, Sharon L.])

Response: *Section 3.3.4 of the EIS will describe nonradioactive waste management systems, including systems for management of hazardous materials.*

D.2.4 Comments Concerning Land Use - Site and Vicinity

Comment: The expansion of the current plant allows the wise use of the existing infrastructure ??? cooling lake, transmission lines, and the like with little or no impact on surrounding landowners or the environment. (**0004-3** [Luton, John Henry])

Response: *The impacts on land use resulting from construction and operation of the proposed facility will be discussed in Chapters 4 and 5 of the EIS.*

D.2.5 Comments Concerning Land Use - Transmission Lines

Comment:
What land will need to be condemned or purchased in order to build or upgrade new transmission lines?

What environmental and economic impacts will result from new transmission lines, including the 345 kV line planned to go between the plant site and the Whitney Switch, going through much of Somervell and Bosque Counties? (**0019-24** [Hadden, Karen])

Response: *Environmental impacts associated with any planned new transmission rights-of-way will be addressed in Chapters 4 and 5 of the EIS, as will potential impacts associated with any upgrades to existing lines or corridors. The applicant is required to follow all Federal, State, and local guidelines concerning siting, construction, and maintenance of proposed transmission corridors and lines, although the NRC does not have regulatory authority over these activities.*

D.2.6 Comments Concerning Meteorology and Air Quality

Comment: All emissions resulting from the project must be in compliance with all applicable air quality regulations, particularly relative to the National Ambient Air Quality Standards (NAAQS) for criteria air pollutants (e.g., ozone, carbon monoxide, nitrogen oxides, sulfur dioxide, lead and particulates). All construction equipment should be tuned to manufacturer's specifications to reduce air emissions. We recommend water for fugitive dust control during construction, instead of oils and other chemicals. (**0027-18** [Osowski Morgan, Sharon L.])

Response: *The NRC staff will evaluate air quality impacts from construction and operation of the station in Chapters 4 and 5, respectively, of the EIS. This evaluation will include assessment of potential equipment operation and dust control measures that may be used to reduce emissions.*

D.2.7 Comments Concerning Geology

Comment: Subsidence is a shifting downward of the earth's surface. Causes of subsidence include depleted groundwater, mining, natural gas and oil extraction. What impacts are there from existing industries that put the area at risk? What landfills are still in existence that could contaminate cooling water? Will local oil and gas operations impact the plant site or vice versa? (**0019-22** [Hadden, Karen])

Response: *Geologic impacts on the proposed facility from off-site actions are within the scope of the safety analysis and will be addressed in the (final safety analysis report) (FSAR) issued and maintained by the applicant and in the SER issued by the NRC. The topic of subsidence and the potential impact on the proposed facility will be addressed in Section 2.5 of the FSAR. This portion of the comment is out of scope with regard to the EIS. The impacts of non-plant discharges to water bodies used for Unit 3 and 4 makeup water will be addressed in the EIS, as will cumulative impacts of Unit 3 and 4 water use and discharges on local and regional water resources.*

Comment: Additional analysis should be undertaken to determine the long-term viability of the Squaw Creek Reservoir retention structure under various scenarios including seismic events, protracted drought and abandonment by the licensee. (**0022-9** [Hadden, Karen])

Response: *The availability of water for Unit 3 and 4 operations and its potential impact on water availability for Unit 1 and 2 operations will be addressed in the EIS. Seismic hazards are outside of the scope of the environmental review. As part of the NRC's site safety review, the staff considers whether, taking into consideration the site criteria in 10 CFR Part 100 and information provided by the applicant, a proposed reactor or reactors can be constructed and operated without undue risk to the health and safety of the public. Abandonment of Squaw Creek Dam by the licensee is outside the scope of the EIS, but would be regulated by the Texas Commission on Environmental Quality (TCEQ) under Title 30 of the Texas Administrative Code, Chapter 299, and would be addressed by State and Federal regulations governing decommissioning and operating license termination for the nuclear plant.*

D.2.8 Comments Concerning Hydrology - Surface Water

Comment: my question relates to the water requirement. I know from experience that when the Comanche peak reservoir gets low, they drain Lake Granbury to make up the difference. I've seen our lake drop over a foot and a half in less than a week during severe drought conditions. This combined with Brazos River Authorities recent decision to sell millions of gallons of water to the natural gas industry looks like it can form a perfect storm to drain our lake during these times of drought. (**0008-1** [Stamler, Richard])

Comment: We need to look closely at water that would be used. I've looked into the license application and found that each reactor, and there's two, would use over 30,000 gallons of water every single minute. And that's huge. And the acre-feet per year are also extensive. There are some diagrams and some facts and figures that we'll be glad to get to you. (**0016-23** [Hadden, Karen])

Comment: And, you know, even our lake—we'll talk about our lake. Granbury is built on a lake community. The whole community, we're lucky, because our water is used to cool those reactors. Because of that, we're not a constant-level lake with BRA, but because of that reason, our lake always will have access to water. (**0016-28** [Berry, Steve])

Comment: I think we've barely begun to look at the water quantity and quality issues here, but I do find it interesting the reminder that the lake is a guaranteed constant-level lake. Well, what do you think that does to everybody else down river? (**0016-42** [Burnam, Lon])

Comment: It's been mentioned about the water flow down the Brazos River. In the—every Thursday in the Fort Worth paper, it tells how much low the lakes are and the water flow. The last—on the first of this year, the PK, where this water comes from and where it would have to be released from if it came here, was 2-1/2 foot low, and the floatation was below minimum. So

if this—if y'all's lake here and your river needs more water, you're going to have to find someplace else to get it.

Granbury was also 2-1/4 foot low.. It was below minimum floatation, and the water flow was 30 cubic feet per second. And Whitney is 20 [cubic] feet per second. Sounds like the river is drying up. Their floatation is also below minimum. Whitney was 9-3/4 foot low.

(**0016-62** [Kinzie, W.T.])

Comment: The water is the biggest issue of all, I would think, because there's so much a demand for it. And if this plant takes more water than it's already taking, then, of course, they have to release more water from the Brazos River Authority. However, when they release this water, the plant takes the water, and that leaves nothing coming down the river, the Brazos River. (**0016-63** [Cathey, Jack])

Comment: So the people here may have to make a choice between, what it said in the paper, $22 billion in the economic impact and how good that's going to do you when you have no drinking water. And that problem is hitting the Dallas-Fort Worth area also.

Lon, you probably know the more specifics on the Dallas-Fort Worth area trying to have another lake or two built, reservoirs for drinking water? And the people in the local areas didn't want their land flooded to make a lake, so it's not going to happen. So Fort Worth and Dallas are trying to get other places for their drinking water. And it's getting to them to where they're not so much worried about their electricity and where it comes from, nuclear power or gas. They're worried about water. (**0016-68** [Kinzie, W.T.])

Comment: our water which we use for drinking water and for recreation, will also be under pressure. So, we have to be very careful, as many have already stated, about the water. (**0016-79** [Rosenfeld, Joshua])

Comment: how will the use of the water affect the run of the river water needed for environmental flows? (**0017-41** [Rooke, Molly])

Comment: if global warming, climate change is occurring, and as severe as we anticipate, will there be enough water for cooling decline, with a 35 percent decrease, when it occurs, in river flows? (**0017-42** [Rooke, Molly])

Comment: Waste of water. (**0017-66** [Sanders, Jan])

Comment: Water; we need to be conserving water. Not developing an energy form that is going to soak it up. We need it for our plants, for our agriculture. We need it to keep on cooling the two reactors that we already have, not building two more. (**0017-72** [Sanders, Jan])

Comment: it is now being predicted that the Southwestern part of the United States will be suffering from a permanent drought for many years. We already see that water is a shortage of water is a critical issue in this state, and will continue to be. (**0017-76** [Stuard, Gary])

Comment: Water flow from Granbury Lake needs to be looked at. (**0018-4** [Cathey, Jack])

Comment: If global warming is occurring and as severe as scientists predict will there be enough cool water to operate the reactors safely? The EIS needs to include analysis based on input from global warming scientists. (**0019-16** [Hadden, Karen])

Comment: In drought conditions, will there be enough water for cities, businesses, farms and ranches if two nuclear reactors are built? (**0019-17** [Hadden, Karen])

Comment: Every minute 31,341 gallons of makeup water from Lake Granbury would be needed for each reactor. (from Environmental report 3.3-5) "Makeup water" replaces the water lost to evaporation and the water called "blowdown" would be returned to Lake Granbury. (**0019-31** [Hadden, Karen])

Comment: This year was one of the worst for water availability that I have seen in the past 31 years. The lake has been sustained at 2.5 feet down from normal levels for most of 2008 and now going into 2009. My family hasn't been able to use the lake for skiing for most of this time. Not being able to use the lake as intended is probably due to a general lack of rain. The increase in water consumption from the lake, authorized by the BRA, hasn't helped the situation. We may be looking at decreased lake levels for years to come due to global warming.

There was an article in the Hood County News that was entitled "NUCLEAR: Lake Granbury water will cool the units". This is in reference to our water being taken to cool two new reactors. There are two points were questions should be asked. Since the conservation pool level is at 693 ft. above mean sea level and the minimum operating elevation is at 675 ft., (a difference of 18 ft.) and Luminant is still in negotiation with the BRA on releasing 75,000 acre feet of water that will help keep Granbury at a usable level and construction is proposed to start late in 2009, then where is the assurance to the people of Granbury that our lake will be usable in the future. Negotiations are not complete, and prevailing rain is not looking good. Is the BRA going to cripple Possum Kingdom Lake to save Lake Granbury? (**0020-1** [Bernier, Jim])

Comment: Global warming and its impacts on rainfall are better understood now and must be considered in the context of determining whether adequate water resources will be available for nuclear plant operations. It is clear that nuclear plants require enormous amounts of water for operations. In fact, the environmental report states that 30,000 gallons of water are needed for each reactor every minute, and shows in Figure 2.3-30 that approximately two-thirds of this water would evaporate. It is also clear, based on the Comanche Peak environmental report, that the proponents of the plant assume that there will be adequate water resources for purposes of plant operations associated with Comanche Peak Units 3 and 4. However, impacts from global warming will include protracted drought that may seriously compromise water resources required for plant operations. (**0022-55** [Hadden, Karen])

Comment: Expanded use of nuclear power in North Texas assumes that there will be an adequate supply of fresh water for purposes of plant operations. This assumption is faulty because of the failure of the Comanche Peak environmental report to analyze impacts of global warming on rainfall and the hydrological cycle. (**0022-6** [Hadden, Karen])

Comment: Future demands on water use should be evaluated. How will CPNPP interact with the surrounding area? For example, investigate interactions with activities related to the Barnett Shale as well as municipal and agricultural water use. A citation from the Texas Water Development Board (TWDB) indicates uncertainty as to whether all supplies indicated in the ER can be obtained. (**0027-12** [Osowski Morgan, Sharon L.])

Comment: The Environmental Report is confusing regarding water uses from sources other than the SCR. For example, p. 2.4-21 indicates that CPNPP is authorized to use 48,300 acre-feet from Lake Granbury each year, but 45,826 was transported in 2006. This seems to indicate that CPNPP exceeded their authorized use. Also, it is not clear why Lake Granbury is used instead of SCR. Please clarify the water uses; perhaps a matrix indicating water intake and discharge, with amounts, etc. would be helpful. (**0027-13** [Osowski Morgan, Sharon L.])

Comment: According to the ER, the estimated water withdrawal for the operation of CPNPP Units 3 and 4 from Lake Granbury is 63,550 gpm (91,512,000 gpd) during maximum operations.

The water discharge rate to Lake Granbury during maximum operations, including loss estimates is estimated at 24,876 gpm (35,821,440 gpd). Consumptive water use for Units 3 and 4 is estimated at 55,690,560 gallons per day. Where are the 55 million gallons of water going each day? (**0027-14** [Osowski Morgan, Sharon L.])

Comment: 100,000 acre feet per year gross water allocation for two new reactors is excessive considering Lake Granbury???s 130,000 gross acre foot pool, and the current (and increasing) contractual obligations for water usage relative to this pool. (**0028-1** [Inge, Charles and Dominique])

Comment: Vast quantities of increasingly precious water would be consumed (**0030-5** [Hadden, Karen])

Comment: The projected amount of water required for the cooling system is unacceptable and risky, to say the least. We are currently facing a water crisis not only in this area but all of Texas. Long range projections indicate a likely increase in drought conditions due to climate change. The continuing, rampant development of this area, along with the Barnett Shale industry, has already pushed the use of our existing water resources to dangerous limits. (**0031-2** [Gentling, Suzanne])

Comment: The application assumes that plenty of water will be available at Squaw Reservoir utilizing a complex pipeline scheme. The EIS must address short and long-term climate change and the resulting hydrological balance. Significant scholarly work now concludes that central north Texas will likely be drier, with less rainfall, putting the plant's expected water use in jeopardy. (**0032-5** [Reed, Cyrus])

Comment: The EIS should also analyze the loss of water to the Brazos River System ??? including the Paluxy River, Whitney Lake, Lake Granbury and Possum Kingdom, as well as the bays downstream, and their likely hydrological and ecological impacts. (**0032-6** [Reed, Cyrus])

Response: *The construction and operation of a nuclear plant involves the consumption of water. The staff will independently assess the impact of these consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population and changes in water supply resulting from climate variability and climate change. While NRC does not regulate or manage water resources, it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment of the impacts on the sustainability of water resources will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively.*

Comment: Need study of impact "down" river. (**0018-6** [Cathey, Jack])

Comment: Biocide, algaecide, pH adjuster, corrosion inhibitor and silt dispersant would be injected into water drawn from Lake Granbury, and only a fraction of the "blowdown" water would be treated before being returned to the lake or sent to an evaporation pond. Why wouldn't all of the water be treated before being returned to the lake? (**0019-32** [Hadden, Karen])

Comment: My primary environmental impact concerns deal with water. Specifically:

- The amount of surface water required for cooling. (33 billion gallon/year)
- The amount of evaporation rate, taking 18 billions gallons per year out of the current fresh water system
- The impact on the immediate environment having 18 billion gallons of water vapor released yearly

- The impact on the water flow in the Brazos River downstream of Lake Granbury
- The quality of the water in Lake Granbury

(**0021-1** [Richardson, Karen])

Comment: Global warming and its impacts on rainfall are better understood now and must be considered in the context of determining whether adequate water resources will be available for nuclear plant operations. It is clear that nuclear plants require enormous amounts of water for operations. In fact, the environmental report states that 30,000 gallons of water are needed for each reactor every minute, and shows in Figure 2.3-30 that approximately two-thirds of this water would evaporate. It is also clear, based on the Comanche Peak environmental report, that the proponents of the plant assume that there will be adequate water resources for purposes of plant operations associated with Comanche Peak Units 3 and 4. However, impacts from global warming will include protracted drought that may seriously compromise water resources required for plant operations.

The compromised water resources should be considered both from a quantitative perspective and a temperature sensitive analysis since plant operations are dependent on a narrow band of water temperatures. (**0022-10** [Hadden, Karen])

Comment: The study should also include an analysis of pollution impacts downstream from water contaminated by chemical treatment such as biocides, algaecides, pH adjustors, corrosion inhibitor and silt dispersant chemicals injected at the reactor site as well as chlorine, salts and non-radioactive effluent. The differential impact of treatment of 100 percent of the water versus the lesser amount of treatment proposed by the applicant should be considered. (**0022-20** [Hadden, Karen])

Comment: The EIS should also consider whether regional waterways will be impacted in terms of water quantity and quality by the use of vast quantities of water for Units 3 and 4, including Lake Granbury, the Brazos River, the Paluxy River, Whitney Lake, a popular fishing lake, and popular recreational areas such as Possum Kingdom. According to the Texas Parks and Wildlife Department web site, the drinking water at Possum Kingdom State Park is currently non-potable due to a high salt content, and visitors must bring their own water for consumption. The potential to increase salt content of waterways in the region by further drawdown of water levels, including impacts to the local aquifer and drinking wells should be examined thoroughly in the EIS. (**0022-22** [Hadden, Karen])

Comment: Questions of the water quality and quantity of "blowdown" water returned to the lake need more thorough evaluation (volume; flow; temperature; salinity; pollutants). (**0028-2** [Inge, Charles and Dominique])

Response: *The construction and operation of a nuclear plant involves the consumption of water and some discharges to nearby water bodies. The Clean Water Act designated the EPA as the Federal agency with responsibility for effluent discharges to the nation's waters. While the NRC does not regulate effluents other than radiological effluents, it does have the responsibility under NEPA to assess and disclose the expected impacts of the proposed action on water quality throughout the plant's life. That assessment will include consideration of salts concentrated in the blowdown system and chemicals injected into raw water systems. Neither does NRC regulate or manage water resources, but it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment will independently determine if the designated uses of the local and regional water supplies are jeopardized by the construction or operation of a nuclear plant at the proposed site, and will independently assess the impact of any consumptive water losses on the sustainability*

of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population and changes in water supply resulting from climate variability and climate change. The staff's assessments of the nonradiological impacts to water quality and impacts to water supply sustainability will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively.

Comment: I do have significant questions about water quantity and 'water quality and the impacts of taking that much water from Lake Granbury downstream. And I would urge you, as part of your assessment, to also look at climate models and weather, given what we think we know about climate change, how that will change the water balances in Lake Granbury. (**0016-52** [Reed, Cyrus])

Response: *The construction and operation of a nuclear plant involves the consumption of water and some discharges to nearby water bodies. The Clean Water Act designated the EPA as the Federal agency with responsibility for effluent discharges to the nation's waters. While the NRC does not regulate effluents other than radiological effluents, it does have the responsibility under NEPA to assess and disclose the expected impacts of the proposed action on water quality throughout the plant's life. Neither does NRC regulate or manage water resources, but it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment will independently determine if the designated uses of the local and regional water supplies are jeopardized by the construction or operation of a nuclear plant at the proposed site, and will independently assess the impact of any consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population and changes in water supply resulting from climate variability and climate change. The staff's assessments of the nonradiological impacts to water quality and impacts to water supply sustainability will be presented in Sections 4 and 5 of the EIS for construction and operation, respectively.*

Comment: Section 6.2.5: This section indicates that within the CPNPP environs, there have been detections of tritium above lower limits of detection in Squaw Creek Reservoir (SCR), and those detections have been well below the reporting limit (30,000 pCi/l). Please clarify whether this means that there have been no detections of tritium in water in Squaw Creek below the dam. Figure 6.2-1 indicates the presence of a surface water collection site on Squaw Creek, although Table 6.2-3 does not list it. It is important to characterize tritium levels in downstream waters as well as the SCR. It would be helpful if the EIS clarified what radiologicals are being collected in Squaw Creek below the dam and provide any data available. (**0027-9** [Osowski Morgan, Sharon L.])

Response: *Staff will clarify the availability of tritium monitoring in and downstream of SCR and will include an assessment of available information in the EIS.*

D.2.9 Comments Concerning Hydrology - Groundwater

Comment: [if global warming, climate change is occurring, and as severe as we anticipate] and so then, will the ground water decline? (**0017-43** [Rooke, Molly])

Response: *The construction and operation of a nuclear plant involves the consumption of water. The staff will independently assess the impact of these consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population and changes in water supply resulting from climate variability and climate*

change. While NRC does not regulate or manage water resources, it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment of the impacts on the sustainability of water resources will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively.

Comment: will it need any groundwater for make up water. (**0017-40** [Rooke, Molly])

Response: *The design of Units 3 and 4 as presented in the license application does not require the use of groundwater for operation.*

Comment: The aquifer below Kames County has been contaminated by uranium mill tailings. The Department of Energy estimates clean up will cost $348 million but, according to a Texas Department of Agriculture report, will not implement the clean up plan. (**0019-28** [Hadden, Karen])

Response: *The issue raised in the comment is outside the scope of the environmental review. There is no evidence of hydrologic connection between Comanche Peak Nuclear Plant surface or subsurface hydrology and that of the aquifer below Karnes County, TX.*

Comment: So, you know, and then recently most of y'all have heard about the Barnett shale in the Tarrant County and Dallas County area, and y'all may have some of it here too. One of the things they do is drill wells, water wells, to get their water from to drill the gas wells, In Parker County, the local farmers, their water wells are drying up. (**0016-66** [Kinzie, W.T.])

Response: *Local and regional uses of groundwater will be considered in Section 2.3.2 of the EIS.*

Comment: The EIS should examine the impacts of vast water consumption on the aquifer and the water table levels. Will wells be sucked dry? (**0019-13** [Hadden, Karen])

Comment: [What are] The indirect impacts on the major aquifers in the region [? Specifically, the]---Paluxy and Trinity. (**0021-2** [Richardson, Karen])

Response: *The applicant is proposing to use less groundwater in the future than what is currently used. The impacts of the proposed groundwater use will be addressed in the Section 5.2 of the EIS.*

Comment: you have mentioned ground water (**0017-35** [Cohn, Ann])

Comment: How high is the risk of contamination of the aquifer and other waterways through radioactive leaks? Could the problem ever be remediated if radioactive or chemical leaks occurred? (**0019-14** [Hadden, Karen])

Comment: The hydrogeological characterization appears adequate for a fundamental understanding of the site (future reactors 3 and 4). Information contained in the ER includes subsurface geology, groundwater occurrence, water levels, flow direction and velocity, and other related information. However, the characterization may not be adequate for detailed analysis of complex groundwater flow conditions and mechanisms including complex fracture flow, groundwater flow along bedding planes, preferential pathways, and other flow complications. (**0027-15** [Osowski Morgan, Sharon L.])

Comment: The ER discusses packer tests and concludes the Glen Rose Formation and sections of the Twin Mountain Formation are impermeable. The Twin Mountain Formation is a highly productive aquifer around the site including numerous public supply wells. It is recommended that additional information be provided to substantiate the claim that these are indeed impermeable.

The ER does not include an individual section indicating the risk of groundwater contamination nor was a methodology for evaluating groundwater risk identified. This information should be part of the conceptual site model. To evaluate site impacts from future groundwater production, it will be necessary to develop a sub-regional scale groundwater model to predict how increased/decreased uses could affect units 3 and 4.

Groundwater flow velocity has been estimated using input from site-specific hydrologic test results. However, if groundwater flow directions or gradients are found to be different than reported, or change over time, the effectiveness of the well network will need to be reevaluated. It is reasonable to expect that additional wells will need to be installed as more water level data become available and flow directions are refined over time.

Groundwater monitoring should include monitoring for contaminants and mixed waste from these sources: non-radioactive solid, liquid, and gaseous waste streams associated with the construction and operation of CPNPP Units 3 and 4, chlorinated fluorocarbons (CFCs), solvents, and used oil. Other sources may include liquid scintillation fluids, other types of organic materials, and metals such as lead and chromium, and aqueous corrosives. (**0027-16** [Osowski Morgan, Sharon L.])

Response: *The risk of contamination of aquifers and other waterways will be addressed in the EIS. Although NRC regulations require licensees to make surveys, as necessary, to evaluate the potential hazard of radioactive material released in order to assess doses to members of the public and workers, recent discoveries of releases at other plants indicate that undetected leakage to groundwater from facility structures, systems, or components can occur, resulting in unmonitored and unassessed exposure pathways to members of the public. The NRC has identified several instances of unintended tritium releases, and all available information shows no threat to the public. Nonetheless, the NRC is inspecting each of these events to identify the cause, verify the impact on public health and safety, and review licensee plans to remediate the event. The NRC also established a lessons learned task force to address inadvertent, unmonitored liquid radioactive releases from U.S. commercial nuclear power plants. This task force reviewed previous incidents to identify lessons learned from these events and to determine what, if any, changes are needed to the regulatory program. Detailed information and updates on these liquid releases can be found on the NRC public website at http://www.nrc.gov/reactors/operating/ops-experience/grndwtr-contam-tritium.htm.*

D.2.10 Comments Concerning Ecology — Terrestrial

Comment: When the first two reactors were built the sky glow light pollution went from zero to off the scale in the direction of the reactors. The latest round of fixture modernization reduced the sky glow by about 40 percent. Our Concern is the two new units will increase the sky glow beyond what it was after initial construction. We would like to see a comprehensive relighting program for all four reactors, using the latest technology zero cut-off fixtures, such as those approved by the International Dark-sky Association in order to achieve an overall reduced light pollution impact than what now exists. www.darksky.org (**0024-2** [Miller, Russ])

Response: *Potential impacts on wildlife of light pollution from operation of the proposed two new nuclear reactor units will be addressed in Chapter 5 of the EIS.*

Comment: The environmental report indicates that Squaw Creek Reservoir will continue to be the receiving body of water for various discharges from Comanche Peak Units 3 and 4. The Environmental Report concedes that radioactive particulate matter released to Squaw Creek Reservoir in liquid effluents will be deposited into the sediment layer of the reservoir bottom and remain there indefinitely. Comanche Peak NPP Environmental Report, p.5.11-3. In the event of

a protracted drought, and inadequate flow into Squaw Creek Reservoir. The sediment layer could become exposed and, if adequately deliquified, would become dust and subject to transport by wind with clear public health and environmental consequences.

Therefore, it is crucial that the EIS include a complete radiological profile of the existing sediment in Squaw Creek Reservoir and an analysis of the cumulative radiological impacts expected from operations on it from Units 3 and 4. This analysis is required in order to fully gauge the environmental and public health impacts from the use of the earthen Squaw Creek Reservoir as a discharge point for radioactive effluent from Comanche Peak Units 3 and 4. Part of this analysis should be an assumption that the Squaw Creek Reservoir dam will at some point fail and release the sediment that is burdened by radioactive particulates. Downstream impacts on water quality, use, and impacts on mortality and morbidity must be a part of a proper EIS. The Squaw Creek Reservoir dam should also be analyzed for structural integrity. Protracted drought, seismic activity, or other natural events have the potential to weaken the dam and if a failure of the structure occurs radioactive sediment could be carried downstream with significant potential for environmental and public health impacts. (**0022-14** [Hadden, Karen])

Response: *The staff will evaluate the radiological impacts of normal operation of the proposed new reactor units in Chapter 5 and the cumulative impacts of the new units in conjunction with existing Units 1 and 2 in Chapter 7 of the EIS. Potential effects on both human health and ecological receptors will be assessed based on appropriate exposure scenarios.*

Comment: The EIS should discuss the location, amount, type, and quality of wetland acreage in the study area, and how wetlands were delineated (i.e., COE, contractor, lead agency, etc.). A draft mitigation plan to compensate for predicted wetland losses should be developed during the NEPA process. Feasible alternatives that avoid wetland impacts should be consistent with the 404(b)(I) guidelines of the Clean Water Act. (**0027-7** [Osowski Morgan, Sharon L.])

Response: *The NRC staff will describe wetlands potentially impacted by the project in Section 2.3.4 of the EIS. The potential impacts to these wetlands will be evaluated in Sections 4.3 and 5.3 of the EIS. Mitigation will be considered in Sections 4.3.3.5 and 5.3.3.5.*

Comment: Biodiversity is defined as the variety of plants and animals (biota) of a site or region, and is typically measured by the number of different species and number of individuals per species. In general, the more diverse an area is (number of habitat types and animal inhabitants) and the better represented these components are (population counts), the more rigorous (resistant, undisturbed, natural, healthy) the area is considered. Specifically, sustainable (or self managed) native biodiversity is preferred compared to an increase in the number of invasive, edge, or opportunistic species. Invasive, edge, or opportunistic species may compete with native species and have the potential to dramatically change local ecosystems so that they are not sustainable. Implementing BMPs or other measures to reduce invasive species establishment should be discussed (Executive Order 13112).
The NEPA document should discuss native biodiversity aspects of the proposal as appropriate. For example, will the project increase, restore, or decrease native biodiversity of the area or region? Coordination with the U.S. Fish and Wildlife Service (FWS), and Texas Parks and Wildlife Department is recommended regarding the design of any project mitigation areas to enhance or restore biodiversity. (**0027-22** [Osowski Morgan, Sharon L.])

Response: *The NRC staff will consider and describe biodiversity in the project area in Section 2.4 of the EIS. Impacts to biodiversity, and mitigation measures as appropriate, will be discussed in Sections 4.3 and 5.3.*

Comment: The FWS is the responsible agency for endangered species compliance, so EPA defers to FWS regarding assessments of Federally-protected endangered species. However, the NEPA document should discuss survey results and adjust the proposed alignment as appropriate. Early coordination with FWS is recommended. (**0027-23** [Osowski Morgan, Sharon L.])

Response: *The NRC staff has begun early consultation with the U.S. Fish and Wildlife Service (FWS) concerning potential project impacts on federally protected threatened and endangered species. NRC's consultations with FWS regarding threatened and endangered species will be discussed in Chapter 4 of the EIS.*

Comment: Chapter 2 -Existing Environment

Section 2.4 of the ER references a List of Somervell County Threatened and Endangered Species to address state-listed threatened or endangered species that may occur at the proposed CPNPP site. The ER failed to include the TPWD Annotated List of Rare Species for Hood County, though it appears that components of the project would occur within Hood County. Additionally, the ER only addressed state-listed threatened or endangered species, but did not address all species included on the Annotated County List of Rare Species. Those species on the list with a blank under federal or state status are tracked by TPWD and considered rare. Rare species are of conservation concern by TPWD within Texas, and efforts to minimize impact to such species are encouraged to help prevent future listing of the species.

The most up-to-date TPWD Annotated County Lists of Rare Species are available at http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx. The lists provide information regarding rare species that have potential to occur within each county. Rare species could potentially be impacted if suitable habitat is present at or near the project site. (**0029-2**[Boydston, Kathy])

Comment: The EIS should address all species on the Hood and Somervell County Lists including rare, threatened, and endangered species. The project site should be assessed to determine if suitable habitat for any of these species occurs within or near the proposed area and to determine if construction and operation of the project would impact the species or habitats. (**0029-2** [Boydston, Kathy])

Response: *The NRC staff will address potential impacts to terrestrial and aquatic biota, including State-listed threatened and endangered species, and suitable habitat potentially on the project site, in Sections 4.3 and 5.3 of the EIS.*

Comment: Wooded riparian corridors along streams generally provide nesting habitat for birds, soil stabilization for enhanced water quality, and food, cover, and travel corridors for wildlife. Riparian habitat is a high priority habitat type for conservation by TPWD across the state. Comment: The project should be designed and constructed to avoid disturbance to stream and riparian areas. (**0029-6** [Boydston, Kathy])

Response: *The NRC staff will address potential impacts to stream and riparian areas, and mitigation measures as appropriate, in Sections 4.3 and 5.3 of the EIS.*

Comment: The proposed project is situated in the Cross Timbers and Prairies Ecoregion of Texas which has generally supported native grassland valley communities with higher wooded divides. Native grassland communities have become increasingly rare in Texas due to historical conversion to row crop agriculture, overgrazing, invasion by woody species from a lack of fire on the landscape, conversion to non-native pastures and hayland, and other development associated with humans. Native grasslands are an important resource for wildlife adapted to

grassland environments. Population declines of many grassland birds are attributed to this loss of habitat. (**0029-7** [Boydston, Kathy])

Comment: The location of facilities should be sited to avoid native grassland communities and placed in areas of previous disturbance or in areas previously converted to non-native pasture. (**0029-7** [Boydston, Kathy])

Response: *The NRC staff will address potential impacts to native grassland communities, and mitigation measures as appropriate, in Sections 4.3 and 5.3 of the EIS.*

Comment: Because native vegetation is adapted to the soil and climate of the area, it usually requires less maintenance and watering than introduced species. Water conservation is warranted for the relatively dry climate of the project area. The disease tolerance of native vegetation provides longevity to the landscape without high cost. Mature trees and shrubs provide nesting, loafing, and forage habitat for birds and other wildlife. (**0029-8** [Boydston, Kathy])

Comment: The project site should be carefully planned and constructed to avoid and preserve existing native vegetation. To eliminate or reduce the need for permanent irrigation, native trees, shrubs, grasses, and forbs should be incorporated into the landscape plan. The following websites describe appropriate native vegetation for the project area, http://www.tpwd.state.tx.us/huntwild/wild/wildscapes/ and http://tpid. tpwd.state.tx.us/. (**0029-8** [Boydston, Kathy])

Response: *The NRC staff will discuss preservation of native vegetation and use of native species for revegetation in Sections 4.3 and 5.3 of the EIS.*

Comment: The revegetation and maintenance plan for temporary disturbed areas should focus on re-establishing native cover through natural regeneration and/or planting and should be developed in coordination with TPWD. Plans for natural regeneration and/or revegetation of disturbed areas should include measures to treat and control undesirable and/or invasive species and should include management practices to benefit wildlife. (**0029-9** [Boydston, Kathy])

Response: *The NRC staff will discuss preservation of native vegetation, use of native species for revegetation, and consideration of control of invasive species in Sections 4.3 and 5.3 of the EIS.*

Comment: The ER did not address the potential for the project site to contain rare plant species or sensitive plant communities that are tracked by TPWD and/or included on our annotated county lists of rare species; therefore impacts to those species or communities were not addressed. (**0029-10** [Boydston, Kathy])

Comment: Sites should be surveyed to identify potential impacts to rare plant species and natural communities identified by TPWD. (**0029-10** [Boydston, Kathy])

Response: *The NRC staff will describe rare and sensitive plant species that potentially occur on the project site in Section 2.4. The potential impacts to these species, based on the likelihood of such species to be present, and potential mitigation measures, will be evaluated in Sections 4.3 and 5.3 of the EIS.*

Comment: Protecting vegetated buffers is discussed in Section 4.3.1.1, though no vegetated buffer areas are specifically identified in the ER. (**0029-11** [Boydston, Kathy])

Comment: The vegetated buffer areas that would receive protection need to be identified and mapped. (**0029-11** [Boydston, Kathy])

Response: *The NRC staff will discuss locations and preservation of vegetative buffer areas in Sections 4.3 and 5.3 of the EIS.*

Comment: Figure 4.2-1 indicates that the area immediately adjacent to the wetland identified along SCR on the cooling tower peninsula is slated as a construction area. During the February 2,2009 site visit, Luminant noted that a buffer area would be placed around the wetland. It is unclear the amount of wooded area on the slopes of the draw that would be excluded from construction activities to serve as the buffer area to the wetland. (**0029-12** [Boydston, Kathy])

Comment: A buffer area developed in coordination with TPWD should be established along the slopes to protect water quality, provide wildlife habitat, and shelter the wetland located down slope at this location. (**0029-12** [Boydston, Kathy])

Response: *The NRC staff will address wetland mitigation, including provision of buffer areas, in Chapters 4 and 5 of the EIS.*

Comment: Section 4.3.1 of the ER indicates that the disturbed area is equivalent to 275 acres and 384 acres, for the CPNPP and the BDTF, respectively. The ER does not distinguish between permanent and temporary disturbance areas per the CPNPP site and the BDTF. The 275-acre CPNPP site is the only area showing impacts by cover type, but the amount of each cover type lost to permanent construction is not provided. No impact assessment per cover type is provided for the 384-acre BDTF, the pipelines, the power transmission lines, or the intake and return structure areas. (**0029-13** [Boydston, Kathy])

Comment: The permanent and temporary disturbances should be revealed per cover type (grassland, scrub brush, disturbed, juniper woodland, wetland, hardwood forest, etc.) per facility (CPNPP, BDTF, power transmission lines, pipelines, and intake and return structure areas). Total temporary and permanent impacts per cover type should be provided for the proposed project, inclusive of the CPNPP, the BDTF, the pipelines, the transmission lines, and the intake and discharge structure areas. This type data can easily be presented in table form. (**0029-13** [Boydston, Kathy])

Response: *The NRC staff will distinguish between permanent and temporary disturbance areas on the project site, including the area of the proposed Blowdown Treatment Facility, as well as assessing habitat cover types in the entire project area. Ecological impacts within the entire project area will be evaluated in Sections 4.3 and 5.3.*

Comment: Construction crews should be informed of the rare species in the project counties and should avoid disturbance to sensitive species if encountered during construction. Only personnel with a TPWD scientific collection permit are allowed to handle and move state listed species. For further information on the required permit please contact Chris Maldonado at (512) 389-4647. (**0029-14** [Boydston, Kathy])

Response: *The NRC staff will describe mitigation measures for rare species in Sections 4.3 and 5.3. Should mitigation include handling and movement of State-listed species, all legal and regulatory requirements would be met.*

Comment: The ER did not address the potential for the project site to contain rare species that are tracked by TPWD and included on our annotated county lists of rare species; therefore impacts to those species were not addressed. The ER does not include a detailed evaluation of impacts associated with the BDTF construction. (**0029-15** [Boydston, Kathy])

Comment: Site surveys of the CPNPP and BDTF sites for rare species with potential to occur within the area should be conducted prior to construction. Occurrences should be avoided or a mitigation plan developed in coordination with TPWD. (**0029-15** [Boydston, Kathy])

Response: *The NRC staff will describe rare and sensitive plant species that potentially occur on the project site, including the Blowdown Treatment Facility, in Section 2.4. The potential impacts to these species, based on the likelihood for such species to be present, and potential mitigation measures, will be evaluated in Sections 4.3 and 5.3 of the EIS.*

Comment: It is not apparent that Chapter 5 of the ER addresses impacts to wildlife associated with operation of the BDTF. The proposed site for the BDTF would include a large area of ponds that may be placed near and/or under existing power transmission lines. The BDTF area is also in close proximity to a large reservoir. Therefore, there is increased potential for use of the area near the transmission lines by migratory and resident waterfowl and shorebirds once the BDTF ponds are installed. The attractiveness of the BDTF ponds to birds would increase the potential for bird collision with the transmission lines. (**0029-21** [Boydston, Kathy])

Comment: Potential collision impacts to migratory and resident birds as a result of constructing large ponds near and/or under transmission lines should be addressed. Measures to avoid or mitigate potential impacts should be developed in coordination with TPWD, such as transmission line marking, relocation of the proposed BDTF ponds, and pre-and post-construction monitoring. (**0029-21** [Boydston, Kathy])

Response: *The NRC staff will describe potential impacts to wildlife from operation of the proposed Blowdown Treatment Facility, and potential mitigation measures, in Sections 4.3 and 5.3 of the EIS.*

Comment: Any potential dangers to wildlife as a result of exposure to the BDTF ponds should also be made apparent. Significant impacts should be mitigated. (**0029-22** [Boydston, Kathy])

Response: *The NRC staff will describe potential impacts to wildlife from operation of the proposed Blowdown Treatment Facility, including associated ponds, and potential mitigation measures, in Sections 4.3 and 5.3 of the EIS.*

Comment: Comment: TPWD is concerned that high salinity reject water (brine) from any desalination process be disposed of in a manner that does not impact fish and wildlife resources. TPWD may offer additional comment when Luminant provides greater detail of proposed operations of the BDTF. (**0029-23** [Boydston, Kathy])

Response: *The NRC staff notes the comment.*

Comment: Because the CPNPP boundary encompasses approximately 7,950 acres inclusive of Squaw Creek Reservoir and large areas of undeveloped property, there is opportunity for Luminant to develop a working plan for conservation, protection, and management offish and wildlife resources within the CPNPP boundary. An adaptive wildlife management plan should be developed in coordination with TPWD. Suggestions for activities to address in the management plan include, but are not limited to:

- Opening Squaw Creek Reservoir or portions of the reservoir for public fishing
- Creating and maintaining native grassland communities within transmission line ROWs and areas of non-native grasslands
- Creating and protecting riparian corridor habitat
- Developing a grazing management plan for areas leased to livestock

- Developing livestock exclusion areas or rotation plans near ponds to help improve water quality and increase wildlife diversity
- Conducting deer management in areas that are overpopulated
- Monitoring and treatment of invasive or undesirable species (**0029-24** [Boydston, Kathy])

Response: *Creation of an adaptive wildlife plan is outside the scope of this review.*

Comment: Rare Resource Occurrences

To support preparation of the EIS, the NRC has requested information regarding state-listed, proposed, and candidate species and protected habitat that may be in the vicinity of the proposed site, the alternative sites, and the transmission line ROWs.

The ER indicates that three alternative sites and a preferred site were considered for the proposed nuclear power plants. The applicant has not revealed the alternative site locations because they hold the locations as proprietary information. The three alternative sites have been described as occurring A) near the border of Victoria and Calhoun counties, B) near the border of San Augustine and Sabine counties, and C) near the border of McLennan and Limestone counties. Therefore, TPWD must present the data regarding known occurrences of rare resources based on countywide sets of data for two counties per site. TPWD has included a l-mile radius buffer beyond the two counties because including a buffer to a project site is typical practice for Texas Natural Diversity Database (TXNDD) searches. This buffer also encompasses area that may be in a different county, but still within 10 miles of the border of the two given counties. To eliminate bias in the evaluation of site alternatives by the NRC, TPWD is submitting data for the proposed site in the same manner encompassing Hood and Somervell counties and a la-mile radius buffer area.

If the actual locations of the alternative sites are provided to TPWD, then we will provide a less intensive list of TXNDD occurrences to the NRC by site location rather than countywide.

TPWD is also submitting a set of data specific to the proposed site location including occurrences within a l-mile buffer area. This data should be considered when assessing the potential impacts to rare resources if the alternatives analysis of the EIS indicates that the proposed site is adequate as the preferred site. Thus, an appropriate evaluation of impacts to rare resources specific to the preferred site can be conducted.

The ER identifies two new proposed 345-kV transmission line routes requiring new ROW, one extending 45 miles to a substation near Lake Whitney in Bosque County and one extending 17 miles to a switching station near Lake Granbury. There are also two new proposed circuits that will be added to vacant positions on two separate existing 345-kV double lattice steel tower structures, one extending 44.8 miles to a switching station in Tarrant County and one extending 41.6 miles to a switching station in Parker County. TPWD understands that the proposed transmission line ROW routes are preliminary and not final. Therefore, the information provided regarding resources within the vicinity of the two new proposed 345-kV transmission line ROWs will need to be updated and an assessment of potential impacts to rare resources will need to be reevaluated once specific routes are identified.

Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only with great difficulty and then only with repeated negative observations, taking into account all the variable factors contributing to the lack of detectable presence.

The TXNDD is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presences, absence or condition of special s (**0029-25** [Boydston, Kathy])

Response: *The NRC staff notes the comment. Since actual locations of the alternative sites have been provided to Texas Parks and Wildlife Department by NRC, staff notes that scope of the occurrence list will be reduced.*

D.2.11 Comments Concerning Ecology - Aquatic

Comment: I want an honest environmental impact statement on protein sources at the estuary of the Brazos River. We keep, over and over again, putting negative impacts on our ability to produce protein from our coastline. And this is just one more example of that. If the NRC does not do an honest assessment of that, it is not a legitimate planning process. I'd like to see that addressed. (**0016-43** [Burnam, Lon])

Comment: It is about the production of protein at the end of this river stream. We are facing a probably extended drought, and you have got the protection here, because your lake is a guaranteed level. But I want to ask you about Possum Kingdom, which is low already. I want to ask you about maintaining the estuary and the protein production at the end of this assembly line, as it were. (**0017-18** [Burnam, Lon])

Response: *The impact of water withdrawals from and discharges to the Brazos River for operation of the proposed new nuclear units will be evaluated and presented in Chapter 5 of the EIS.*

Comment: I used to go fishing in Squaw Creek. In the local paper, like I said, it always gives the lake levels and the temperature of the waters. Squaw Creek would go -the highest I ever saw it was 104 degrees. And, yes, there would be fish dead. Matter of fact, no matter where I was in the lake, I could always see at least one dead fish, unless I was on the—close to the bank. Then there was a lot of dead fish and a lot of buzzards.

And that may sound kind of funny, but the ones that the dead fish and the maggots and that sort of stuff that the buzzards eat, it kind of went over the spillway. And that might be why these problems with Squaw Creek downstream. And also, when you came over the hill to go down to the boat ramp area, you could smell dead fish.

And it's not as if I was going to eat something I caught out of that lake at that time, but I just went out there to kind of see what kind of deal this is. And I wish I had taken a movie or something to show you, because it would make an effect on your—just the way you think. (**0016-69** [Kinzie, W.T.])

Comment: Discharging "hot" water from Squaw Creek needs to be studied. Loss of fish, turtles, frogs. (**0018-5** [Cathey, Jack])

Response: *The NRC staff will assess potential impacts to aquatic life in Lake Granbury, the Brazos River, and Squaw Creek due to thermal discharge from the proposed new reactor units in Section 5 of the EIS.*

Comment: Need study of impact "down" river. (**0018-7** [Cathey, Jack])

Response: *The NRC staff will assess potential ecological and hydrological impacts in Lake Granbury, the Brazos River, and Squaw Creek Reservoir due to operation of the intake and discharge from the proposed new reactor units in Chapter 5 of the EIS.*

Comment: The adverse effects of elevating water temperatures in our rivers is sacrificing the integrity of these precious ecosystems and harming biological development and survival. This is unacceptable and irresponsible. (**0031-3** [Gentling, Suzanne])

Response: *The NRC staff will assess potential impacts to aquatic life in the Brazos River from thermal discharge of the proposed new reactor units in Chapter 5 of the EIS.*

Comment: The EIS must do a full analysis of how much of each of these contaminants [i.e., biocide, algaecide, pH adjuster, corrosion inhibitor and silt dispersant] would end up in Lake Granbury, how much would migrate into the Brazos River and how much would escape through evaporation. The exact chemical names must be included, not just generic terms such as "biocide." The impacts of exposure of humans, animals and wildlife to these toxic compounds should be analyzed. (**0019-12** [Hadden, Karen])

Comment: The study should also include an analysis of pollution impacts downstream from water contaminated by chemical treatment such as biocides, algaecides, pH adjustors, corrosion inhibitor and silt dispersant chemicals injected at the reactor site as well as chlorine, salts and non-radioactive effluent. The differential impact of treatment of 100 percent of the water versus the lesser amount of treatment proposed by the applicant should be considered. (**0022-18** [Hadden, Karen])

Response: *The staff's assessment of the nonradiological impacts to water quality will be presented in Chapter 5 of the EIS.*

Comment: Global warming and its impacts on rainfall are better understood now and must be considered in the context of determining whether adequate water resources will be available for nuclear plant operations. It is clear that nuclear plants require enormous amounts of water for operations. In fact, the environmental report states that 30,000 gallons of water are needed for each reactor every minute, and shows in Figure 2.3-30 that approximately two-thirds of this water would evaporate. It is also clear, based on the Comanche Peak environmental report, that the proponents of the plant assume that there will be adequate water resources for purposes of plant operations associated with Comanche Peak Units 3 and 4. However, impacts from global warming will include protracted drought that may seriously compromise water resources required for plant operations. The compromised water resources should be considered both from a quantitative perspective and a temperature sensitive analysis since plant operations are dependent on a narrow band of water temperatures. (**0022-11** [Hadden, Karen])

Comment: The EIS should also consider whether regional waterways will be impacted in terms of water quantity and quality by the use of vast quantities of water for Units 3 and 4, including Lake Granbury, the Brazos River, the Paluxy River, Whitney Lake, a popular fishing lake, and popular recreational areas such as Possum Kingdom. According to the Texas Parks and Wildlife Department web site, the drinking water at Possum Kingdom State Park is currently non-potable due to a high salt content, and visitors must bring their own water for consumption. The potential to increase salt content of waterways in the region by further drawdown of water levels, including impacts to the local aquifer and drinking wells should be examined thoroughly in the EIS. Coastal environmental impacts are known to result from alterations of freshwater flow into the Gulf of Mexico, affecting lagoons, estuaries and wetlands, altering salinity patterns, nutrients, dissolved oxygen levels and therefore impacting productivity of coastal plant and

animal populations. The biological impacts must be considered in the EIS including the possibility of eutrophication, productivity and sediment impacts, and potential contamination. (**0022-21** [Hadden, Karen])

Comment: Friends of the Brazos River (FBR) is a non-profit organization with 450 members in the Glen Rose, Granbury, Dallas and Ft. Worth area whose main concern is the ecological integrity of the Brazos between Lakes Granbury and Whitney. In our opinion, the Brazos is an imperiled ecosystem, largely due to the over-allocation of Brazos water by the Brazos River Authority. We are currently working cooperatively with BRA, TCEQ and other state agencies to insure that BRA???s current water right application allows for adequate in stream flows. It is our understanding that the cooling systems for the additional reactors at Comanche Peak will lose approximately 55,000 acre ft. of Brazos water annually to evaporation. Whereas, we do not oppose the additional reactors. We do oppose the loss of so much Brazos water. (**0025-1** [Lowe, Ed])

Response: *The staff will assess the impact of consumptive water losses related to the proposed action on the sustainability of both local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of future populations, and changes in water supply resulting from climate variability and climate change. The staff's assessment of impacts on water resources and related ecological impacts will be presented for construction and operation in Chapters 4 and 5 of the EIS, respectively.*

Comment: The environmental report indicates that Squaw Creek Reservoir will continue to be the receiving body of water for various discharges from Comanche Peak Units 3 and 4. The Environmental Report concedes that radioactive particulate matter released to Squaw Creek Reservoir in liquid effluents will be deposited into the sediment layer of the reservoir bottom and remain there indefinitely. Comanche Peak NPP Environmental Report, p.5.11-3. In the event of a protracted drought, and inadequate flow into Squaw Creek Reservoir. The sediment layer could become exposed and, if adequately deliquified, would become dust and subject to transport by wind with clear public health and environmental consequences.

Therefore, it is crucial that the EIS include a complete radiological profile of the existing sediment in Squaw Creek Reservoir and an analysis of the cumulative radiological impacts expected from operations on it from Units 3 and 4. This analysis is required in order to fully gauge the environmental and public health impacts from the use of the earthen Squaw Creek Reservoir as a discharge point for radioactive effluent from Comanche Peak Units 3 and 4. Part of this analysis should be an assumption that the Squaw Creek Reservoir dam will at some point fail and release the sediment that is burdened by radioactive particulates. Downstream impacts on water quality, use, and impacts on mortality and morbidity must be a part of a proper EIS. The Squaw Creek Reservoir dam should also be analyzed for structural integrity. Protracted drought, seismic activity, or other natural events have the potential to weaken the dam and if a failure of the structure occurs radioactive sediment could be carried downstream with significant potential for environmental and public health impacts. (**0022-13** [Hadden, Karen])

Comment: Squaw Creek Reservoir should be analyzed for radiological hazards because of radioactive particulates currently discharged from Comanche Peak Units 1 and 2 that are accumulating in sediment and additional radionuclide loading if Units 3 and 4 are operational. (**0022-8** [Hadden, Karen])

Response: *The staff will evaluate the radiological impacts of normal operation of the proposed new reactor units in Chapter 5, and the cumulative impacts of the new units in conjunction with*

existing Units 1 and 2 in Chapter 7 of the EIS. Potential effects on both human health and ecological receptors will be assessed based on appropriate exposure scenarios.

Comment: Tritium and other radioactive particulates as well as water temperatures are major concerns for the receiving waters. These must be adequately addressed in light of the additional water discharges from Units 3 and 4 both in the receiving waters, but also downstream. (**0032-7** [Reed, Cyrus])

Response: *The staff will evaluate the radiological impacts of normal operation of the proposed new reactor units in Chapter 5, and the cumulative impacts of the new units in conjunction with existing Units 1 and 2 in Chapter 7 of the EIS. Potential effects on both human health and ecological receptors will be assessed based on appropriate exposure scenarios. Potential impacts to aquatic life from the thermal discharge of the proposed new units also will be assessed for Lake Granbury and the Brazos River downstream in Section 5 of the EIS.*

Comment: The other thing I'd like to address is the biggest thing that we missed of all, is on the environmental studies, is what happens after they cool the plant. They release the water down Squaw Creek, which is just about a mile behind you. And that water is extremely hot. It's not warm water; it's hot water.

Now then, in the past ten to 12 years—and I'm just talking about Squaw Creek, which is not a very big area—there were many, many frogs and soft-shelled turtles, many of them, and nobody in this room has been on that river more than I have. There's no soft-shelled turtles down there. The frogs are gone. And I've always been informed in environmental, frogs are the first thing that tell you there's something wrong. And there's something wrong with the release of that water.

The water is too hot. It has bothered the spawning of the fish. When I say there's no—I don't mean there's not any. mean, they're disappearing. The fish, they're still there, but they're disappearing. There's something wrong that needs to be looked into in your study very, very serious. Something that's not happening, not something that you need to do later on; it's something that needs to be done right now. It's happening as we're sitting here.
And it's something on all these studies—and I notice on that chart up there, it said aquatic studies. I've never seen one. I've never seen one of what happens after the fact. Studies are done about the fish in the lake, but nothing is happen—and it's just growing right down the river. The—it's not the only problem, The problem is with low water, if you add hot water, you get hot water down the river in the summertime. And if you—all you have to do is go stick your hand in it. And it's hot. And it's something that I'd like for you to address, and really it's never been even looked at. And why we let it get by, I don't know, but I never thought about it until after the fact. And the only way that I really know about this is firsthand information, because I'm on that river every single day. (**0016-64** [Cathey, Jack])

Response: *The NRC staff will assess potential impacts to aquatic life in Lake Granbury, the Brazos River, and Squaw Creek due to thermal discharge from the proposed new reactor units in Chapter 5 of the EIS.*

Comment: The above article said that water will be returned at 91 to 93 degrees. If we have limited rain and the BRA chooses to decrease the flow from PK then what will happen to the water temperature of the water at the dam site? This is the only deep water area of the lake. What becomes of our game fish?
(**0020-2** [Bernier, Jim])

Response: *The NRC staff will assess potential ecological and hydrological impacts in Lake Granbury, the Brazos River, and Squaw Creek Reservoir due to operation of the intake and discharge from the proposed new reactor units in Chapter 5 of the EIS.*

Comment: A Total Dissolved Solids (TDS) concentration of 1680 mg/l is on the borderline for lethal toxicity, and a TDS concentration of 2500 mg/l is above. Given that there will also be biocide usage in the cooling towers, whole effluent toxicity (WET) testing will be required, and there is reason to expect lethal and sublethal effects in WET testing. CPNPP should sample the water from Lake Granbury and perform 7-day chronic toxicity tests. CPNPP should also evaporate a portion of the sample to approximately 2500 mg/l and perform the same test. This would be predictive of the final effluent and would provide a sound basis for decision-making. (**0027-10** [Osowski Morgan, Sharon L.])

Response: *Impacts on aquatic biota and habitat due to liquid chemical effluents resulting from facility operation will be discussed in Section 5.3.2.*

Comment: Biodiversity is defined as the variety of plants and animals (biota) of a site or region, and is typically measured by the number of different species and number of individuals per species. In general, the more diverse an area is (number of habitat types and animal inhabitants) and the better represented these components are (population counts), the more rigorous (resistant, undisturbed, natural, healthy) the area is considered. Specifically, sustainable (or self managed) native biodiversity is preferred compared to an increase in the number of invasive, edge, or opportunistic species. Invasive, edge, or opportunistic species may compete with native species and have the potential to dramatically change local ecosystems so that they are not sustainable. Implementing BMPs or other measures to reduce invasive species establishment should be discussed (Executive Order 13112).

The NEPA document should discuss native biodiversity aspects of the proposal as appropriate. For example, will the project increase, restore, or decrease native biodiversity of the area or region? Coordination with the U.S. Fish and Wildlife Service (FWS), and Texas Parks and Wildlife Department is recommended regarding the design of any project mitigation areas to enhance or restore biodiversity.

Studies as similar as possible to those performed prior to Units 1 and 2 becoming operational (1981) should be conducted for comparison purposes and to ascertain losses in species abundance and richness over time. For example, 26 species of fish were caught in 1987, but only 10 in 2007 (Table 2.4-13). Tables 2.4-3, 2.4-4, 2.4-7, 2.4-13, and 2.4-14 all show declines in species richness over time. If the method used led to misleading sample, then new sampling schemes should be developed or methods used in 1987 should be used (p. 2.4-24). Table 2.4-4 has observed and expected data; therefore, simple statistics (like Chi squared, etc) could be performed to provide confidence bounds on the data and to determine whether the observations show a true pattern or are random statistical events.

The ER indicated that CPNPP would draw water for cooling from Lake Granbury. Additional studies of the impacts to aquatic ecology should be performed. Even though aquatic organisms may retreat to other areas in SCR or Lake Granbury, there are limits to what the organisms can tolerate, both in pollutant load, sediment load, high water temperature, and the amount of time they are exposed to such conditions (p. 4.3-10). (**0027-21** [Osowski Morgan, Sharon L.])

Response: *Impacts on aquatic ecology from cooling water withdrawals and discharges, including the potential for impacts on the biodiversity of aquatic communities, will be analyzed based on available data for Lake Granbury, the Brazos River, and Squaw Creek Reservoir in Chapters 4 and 5 of the EIS.*

Comment: Chapter 2 -Existing Environment: Section 2.4 of the ER references a List of Somervell County Threatened and Endangered Species to address state-listed threatened or endangered species that may occur at the proposed CPNPP site. The ER failed to include the TPWD Annotated List of Rare Species for Hood County, though it appears that components of the project would occur within Hood County. Additionally, the ER only addressed state-listed threatened or endangered species, but did not address all species included on the Annotated County List of Rare Species. Those species on the list with a blank under federal or state status are tracked by TPWD and considered rare. Rare species are of conservation concern by TPWD within Texas, and efforts to minimize impact to such species are encouraged to help prevent future listing of the species.

The most up-to-date TPWD Annotated County Lists of Rare Species are available at http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx. The lists provide information regarding rare species that have potential to occur within each county. Rare species could potentially be impacted if suitable habitat is present at or near the project site. (**0029-1** [Boydston, Kathy])

Comment: The EIS should address all species on the Hood and Somervell County Lists including rare, threatened, and endangered species. The project site should be assessed to determine if suitable habitat for any of these species occurs within or near the proposed area and to determine if construction and operation of the project would impact the species or habitats. (**0029-1** [Boydston, Kathy])

Response: *For both Somervell and Hood Counties, species with a Federal or State listing status of endangered or threatened and species considered by the State as rare will be identified in Chapters 2 of the EIS, and potential impacts to these species from construction and operation of the proposed new reactor units will be evaluated in Chapters 4 and 5, respectively.*

Comment: Section 2.4.2.2 of the ER provides basic details about the fish studies conducted for Squaw Creek Reservoir and Lake Granbury. Fish avoidance of gill nets is a known problem in reservoirs with high water clarity, such as Squaw Creek Reservoir and near the dam on Lake Granbury. (**0029-3** [Boydston, Kathy])

Comment: Further information is needed about the monofilament nets used to sample the fish population, the depth at which gill nets were placed, and the gill net mesh size used. Mesh sizes too large to capture smaller fish would produce inaccurate results. Electrofishing, even with high total dissolved solids, would likely provide important additional information on fish populations in both reservoirs. Seining in littoral areas could provide information about smaller species that are unlikely to be captured by gill nets. (**0029-3** [Boydston, Kathy])

Response: *Additional information about fish sampling methods and apparatus will be provided in Section 2.4.2 of the EIS.*

Comment: During the February 2, 2009 site visit, and in Section 4.3.2.4 of the ER, it was mentioned that fish populations are struggling in Lake Granbury. The consultant's sampling at four sites near the dam claims to support this opinion. The TPWD Inland Fisheries staff conducts full fishery studies on the lake every four years as well as ongoing fish sampling. These studies show that only a few fish species have declined post-golden algae kills, many have remained at the same population levels, and some have increased in numbers (Baird and Tibbs 2006). The opinion that the fishery is dead by the dam due to golden algae is not supported by the information provided. Request: TPWD requests a copy of the fish studies conducted by Luminant's consultant, specifically the studies referenced in Chapter 2.4 of the

ER, Bio-West 2008a and 2008b. TPWD staff may have additional comments following review of the consultant's report. (**0029-5** [Boydston, Kathy])

Response: *The information provided by the TPWD fisheries study in Lake Granbury will be considered in conjunction with the studies cited in the applicant's ER when the NRC staff assesses in the EIS the current condition of fish populations in the lake and potential future impacts.*

Comment: Section 5.2 discusses water-related impacts associated with water withdrawal from Lake Granbury, water loss, and return discharge to Lake Granbury. The ER claims that there is currently minimal use of water in the Brazos River from Possum Kingdom Lake to Lake Whitney; and due to the minimal water use and other users returning water to the Brazos River Basin, the project impacts are not expected to affect the available water for other water users nor for the aquatic ecological communities of the Brazos River. The ER considers the impacts from the CPNPP water withdrawal and discharge rates as small. The ER presents the reported mean monthly discharges at DeCordova Bend Dam at 1,031 cubic feet per second (cfs) and indicates that anticipated normal discharge would be 55.43 cfs during operation of CPNPP Units 3 and 4.

The operational impacts associated with water use do not specifically address potential impacts to aquatic resources such as potential impacts to the state threatened Brazos Water Snake (Nerodia harteri), various rare species of mollusks listed on the county lists, and other aquatic resources occurring or potentially occurring downstream of Lake Granbury. Potential impacts associated with CPNPP water losses need to be specifically addressed for aquatic resources within the Brazos River Basin. (**0029-16** [Boydston, Kathy])

Response: *The NRC staff will assess potential impacts on aquatic life in the Brazos River basin due to hydrological effects from operation of the proposed new reactor units in Chapter 5 of the EIS.*

Comment: Chapter 2 Section -2.3.3.1.9 and Chapter 5 Sections -5.2.1. 7 and 5.2.3.4, Golden algae, specifically Prymnesium parvum, are microscopic plants present in Possum Kingdom Reservoir, Lake Granbury, and Lake Whitney, as well as other areas in the state. The alga prefers saltier water for growth as it is a marine species. Lower water levels in Possum Kingdom Reservoir would likely make the lake more susceptible to golden alga. Like most other reservoirs, when the water level in Possum Kingdom Reservoir is low, conditions become more saline and nutrients become more concentrated. Historically, both conditions have been associated with increased occurrence and severity of golden algal blooms in Possum Kingdom Reservoir and other Texas reservoirs. An increase in salinity (conductivity) within Lake Granbury would likely also cause enhanced golden algal blooms. With the return water entering by the dam, the potential for increased conductivity by the dam and immediately downstream is a concern as well. (**0029-17** [Boydston, Kathy])

Comment: If golden alga occurrences increase in severity after periods of water loss, then Luminant may be required through TPWD's civil restitution process to mitigate for fish mortalities from these golden alga kills and may be asked to contribute to annual restocking efforts or golden alga treatment and research. (**0029-17** [Boydston, Kathy])

Response: *Water quality impacts from operation of the proposed new reactor units and their potential effects on aquatic life will be assessed in Chapter 5 of the EIS.*

Comment: TPWD has concerns about increased selenium levels in Lake Granbury and downstream portions of the Brazos River resulting from the discharge. As stated in Section 5.2.3.4, When half the detection limit was used to estimate concentrations that would

result from CPNPP Units 3 and 4 2.4-cycle cooling tower operation, selenium was estimated to exceed the Texas Commission on Environmental Quality (TCEQ) Criteria for Specific Metals in Water for Protection of Aquatic Life and also for both the mean and maximum concentrations when mixed with Lake Granbury at low flow. However, selenium is expected to be reduced to concentrations less than the TCEQ standards for Specific Metals in Water for Protection of Aquatic Life at the edge of the mixing zone in Lake Granbury during the annual mean flow for both mean and maximum concentrations. The acute freshwater criteria for selenium is 0.020 mg/L and freshwater chronic criteria is 0.005 mg/L (TCEQ 2008). Exceeding the set criteria can be harmful to aquatic life within and downstream of the reservoir. (**0029-18** [Boydston, Kathy])

Comment: Section 5.2.2.3.1: The consumptive demands from the project are a concern for the Brazos River Basin. Chapter 3 Section 4 indicates that Luminant will use up to 103,000 acre-feet per year (ac-ft/yr) of water from Lake Granbury for the cooling process with an estimated evaporative loss of 61,000 ac-ft/yr. The loss of 61,000 ac-ft/yr from Possum Kingdom Reservoir, Lake Granbury and the Brazos River will lead to declines in lake levels, a reduction of streamflow downstream of Lake Granbury, and a resultant wide range of impacts on fish and wildlife resources and recreation.

Fisheries may be impacted; reduced flows in the Brazos River below Waco may impact several imperiled fish species, as well as a vulnerable alligator gar fishery. Water levels are also anticipated to drop in Possum Kingdom Reservoir since the water for Units 3 and 4 will be taken from Lake Granbury but supplied by releases from Possum Kingdom Reservoir. Currently, Possum Kingdom Reservoir struggles with having enough water to inundate littoral vegetation during spawning times for a variety of sport fish. The proposed water loss would exacerbate an already less than desirable condition. In addition, lowering the water level in Possum Kingdom Reservoir will expose fish habitat used for sheltering and feeding, as well as for breeding. This loss of habitat, especially during spawning season, is likely to impact fish populations. (**0029-19** [Boydston, Kathy])

Response: *The NRC staff will assess potential hydrological, water quality, and resulting ecological impacts in the Brazos River basin associated with the intake and discharge from operation of the proposed new reactor units in Chapter 5 of the EIS.*

D.2.12 Comments Concerning Socioeconomics

Comment: And as far as y'all wanting to bring in extra jobs and more people, you would think it would be a joke about Weatherford having traffic problems. But try to be on Main Street or Santa Fe some day between four and five o'clock. Weatherford has traffic jams, and it's crazy, but at least they've got those big trucks and all the equipment that are related to the Barnett shale drilling. And the trucks are tearing up our roads. (**0016-70** [Kinzie, W.T.])

Response: *Potential effects on local roads and traffic conditions will be addressed in Section 4 of the EIS for the construction period and in Chapter 5 of the EIS for the operations period.*

Comment: The City knows that this could have some burdens on the City, because we don't get any tax dollars for it, and we know that it could prevent a lot of people from moving into the city. It might have an effect on the water and the sewer and the roads. (**0017-1** [Miller, Pam])

Response: *Potential effects on local roads and traffic conditions, public services, and tax revenues will be addressed in Chapter 4 of the EIS for the construction period and in Chapter 5 of the EIS for the operations period*.

Comment: The EIS should also consider whether regional waterways will be impacted in terms of water quantity and quality by the use of vast quantities of water for Units 3 and 4, including

Lake Granbury, the Brazos River, the Paluxy River, Whitney Lake, a popular fishing lake, and popular recreational areas such as Possum Kingdom. According to the Texas Parks and Wildlife Department web site, the drinking water at Possum Kingdom State Park is currently non-potable due to a high salt content, and visitors must bring their own water for consumption. The potential to increase salt content of waterways in the region by further drawdown of water levels, including impacts to the local aquifer and drinking wells should be examined thoroughly in the EIS. (**0022-23** [Hadden, Karen])

Response: *Potential impacts of plant operations on water quantity and quality in regional waterways will be addressed in Chapter 5 of the EIS.*

Comment: Since the specialized job skills required to manufacture nuclear reactors are virtually non-existent in the US, what is the plan to create jobs for Americans if the Comanche Peak project is approved? (**0023-1** [Ubico, Jean])

Response: *Potential effects on employment will be addressed in Chapter 4 of the EIS for the construction period and in Chapter 5 of the EIS for the operations period.*

Comment: When the first two reactors were built the sky glow light pollution went from zero to off the scale in the direction of the reactors. The latest round of fixture modernization reduced the sky glow by about 40 percent. Our Concern is the two new units will increase the sky glow beyond what it was after initial construction. We would like to see a comprehensive relighting program for all four reactors, using the latest technology zero cut-off fixtures, such as those approved by the International Dark-sky Association in order to achieve an overall reduced light pollution impact than what now exists.

www.darksky.org (**0024-3** [Miller, Russ])

Response: *The effects of light pollution from the proposed new reactors will be addressed in Chapter 5 of the EIS.*

Comment: I would like to see the lake at the Comanche Peak Nuclear Power Plant reopened for fishing. The possiblilty of a special license seems like a logical way to go to me. Restricted to Texas residences with concealed handgun licenses may be an option, since they have already passed a background check. Also, advance reservations, limited number of boats on the lake at a time, no more than 3 people per boat, etc. Fingerprints, photo on file, etc. Fishing only. No skiing or jet skis. Daylight hours only. I would like to allow tube floats and oar prepelled watercraft. You could even set it up with a limited season only open during certain months. It just seems a shame to me that this lake is closed to the taxpayers of Texas and the honest law abiding fishermen (and women). (**0007-1** [Drechel, Gary])

Response: *The potential effects of plant construction and operations on recreation will be addressed in Chapters 4 and 5 of the EIS.*

Comment: The new plant will need to use existing roads and to build new ones. Lots of cars, trucks, and machinery will pass over them.

- How will Luminant ensure that roads are not congested? How will Luminant transport uranium and on which highways? Which communities will it pass through, and will their police and firefighting forces be trained to deal with a radioactive accident?
- How would Luminant transport low-level and high-level radioactive waste if offsite storage ever gets approved?

(**0019-23** [Hadden, Karen])

Response: *Existing local road and traffic conditions will be described in Chapter 2 of the EIS. The effects of plant construction and operations on local roads and traffic will be addressed under Socioeconomics in Chapters 4 and 5. In addition, the impacts of transporting unirradiated and spent fuel will be addressed directly in Chapter 6 of the EIS.*

Comment: Comanche Peak is very vital to the local economy (**0004-4** [Luton, John Henry])

Response: *The potential effects of plant construction and operations on local employment, expenditures, and tax revenues will be addressed in Chapters 4 and 5 of the EIS.*

Comment: The City of Granbury has joined Hood County in soliciting funds, or looking for funds, to build the new access route to come near the Comanche Peak location, to provide better access to and from the location. We do hope you all will endorse that project as well. (**0016-3** [Johnson, Lisa])

Response: *A description of local roads and traffic conditions in the vicinity of the site will be provided in Chapter 2 of the EIS. The effects on local roads and traffic conditions during the construction and operation periods will be addressed in Chapters 4 and 5 of the EIS. Endorsement of mitigation activities are outside the scope of the NRC's authority and will not be addressed further.*

Comment: And as an economic development, I know that the NRC is not in economic development, but it's very nice for our community to have the jobs that come along with expansion, the jobs and the need for new housing, the need for restaurants and services in our community, which currently is vastly needed. (**0016-32** [Ward, Mary])

Response: *The effects of plant construction and operations on local employment, expenditures, and housing will be addressed in Chapters 4 and 5 of the EIS.*

Comment: I'm also the incoming president of the Brazos River Conservation Coalition. ...

We're an organization of about 700 members from Parker, Palo Pinto, and Hood and Somervell County. Right now we have an initiative to declare the—and it's in the legislature, or it's going in this session—the Brazos River and Lake Granbury—Brazos River in Hood and Somervell County as part of the John Graves Scenic Riverway. I don't know how many people from outside the area know just what a beautiful resource it is. We heard some of the people talking about it. It's a resource that's under a lot of pressure. (**0016-78** [Rosenfeld, Joshua])

Response: *A description of local aesthetic and recreational resources in the vicinity of the site will be provided in Chapter 2 of the EIS. Effects on local aesthetic and recreational resources during the construction and operation periods will be addressed in Chapters 4 and 5 of the EIS.*

Comment: We don't need to contribute to the economy of Somervell County and Hood County for the benefit of their gaining on a rate. (**0017-12** [Burnam, Lon])

Response: *The impacts of plant construction and operations on local employment, expenditures, and tax revenues will be addressed in Chapters 4 and 5 of the EIS.*

Comment: I am a business owner here in Glen Rose. I have been, and I have had land here for over ten years. And one of the things that attracted me to this area was the fact that there was a nuclear power plant here. Recently, I just invested over $6 million in this community in a hotel. Based on the future growth that these kind of communities bring. (**0017-56** [Sheaks, Jerry])

Response: *The effects of plant construction and operations on the local economy and the demand for housing will be addressed in Chapters 4 and 5 of the EIS.*

Comment: Section 5.2.2.3.1: The consumptive demands from the project are a concern for the Brazos River Basin. Chapter 3 Section 4 indicates that Luminant will use up to 103,000 acre feet per year (ac-ft/yr) of water from Lake Granbury for the cooling process with an estimated evaporative loss of 61,000 ac-ft/yr. The loss of 61,000 ac-ft/yr from Possum Kingdom Reservoir, Lake Granbury and the Brazos River will lead to declines in lake levels, a reduction of streamflow downstream of Lake Granbury, and a resultant wide range of impacts on fish and wildlife resources and recreation. ... Potential recreational effects span from Possum Kingdom Reservoir, to below the Lake Granbury dam, to the Brazos River below the city of Waco. Possum Kingdom Reservoir receives heavy recreational use, Lake Granbury supports recreational use, water skiers frequently use the Brazos River between Lake Granbury and Lake Whitney, and Lake Whitney has been rated the top destination by the citizens in the Dallas/Fort Worth area. Downstream of Lake Whitney, the Brazos River has been recognized as a canoeing and kayaking destination and Lake Brazos within the city of Waco is currently being developed into a major greenbelt. (**0029-20** [Boydston, Kathy])

Response: *Potential impacts of plant operation on water-based recreation in the region will be addressed in Chapter 5 of the EIS.*

D.2.13 Comments Concerning Historic and Cultural Resources

Comment: On December 30, 2008, the Advisory Council on Historic Preservation (ACHP) received from the Nuclear Regulatory Commission (NRC) a notification pursuant to Section 800.8(c) of the ACHP's regulations, Protection of Historic Properties (36 CFR 800), regarding the referenced project. We appreciate receiving your notification, which establishes that NRC will use the process and documentation required for the preparation of an EA/FONSI or an EIS/ROD to comply with Section 106 of the National Historic Preservation Act in lieu of the procedures set forth in 36 CFR 800.3 through 800.6.

In addition to notification to the ACHP, NRC must also notify the Texas State Historic Preservation Officer and meet the standards in Section 800.8(c)(I)(i) through (v) for the following:

- identifying consulting parties;
- involving the public;
- identifying historic properties and assessing the undertaking's effects on historic properties; and
- consulting regarding the effects of the undertaking on historic properties with the SHPO/THPO, Indian tribes and Native Hawaiian organizations that might attach religious and cultural significance to affected historic properties, other consulting parties, and the ACHP, where appropriate, during NEPA scoping, environmental analysis, and the preparation of NEPA documents.

To meet the requirement to consult with the ACHP as appropriate, the NRC should notify the ACHP in the event NRC determines, in consultation with the SHPO/THPO and other consulting parties, that the proposed undertaking(s) may adversely affect properties listed, or eligible for listing, on the National Register of Historic Places (historic properties). In addition, Section 800.8(c)(2)(i) requires that you submit to the ACHP any DEIS or EIS you prepare. Inclusion of your adverse effect determination in both the DEIS/EIS and in your cover letter transmitting the DEIS/EIS to the ACHP will help ensure a timely response from the ACHP regarding its decision to participate in consultation. Please indicate in your cover letter the schedule for Section 106 consultation and a date by which you require a response by the ACHP.

The regulations do not specifically require that an agency submit an EA to the ACHP. However, keep in mind that, in the case of an objection from the ACHP or another consulting party, Sections 800.8(c)(2)(ii) and (c)(3) provide for ACHP review of an EA (in addition to a DEIS or EIS) to determine whether preparation of the EA, DEIS or EIS has met the standards set forth in Section 800.8(c)(1) and/or to evaluate whether the substantive resolution of the effects on historic properties proposed in an EA, DEIS or EIS is adequate.
If NRC's determination of adverse effect will be documented in an EA, we request that you notify us of the adverse effect and provide adequate documentation for its review. The ACHP's decision to review an EA, DEIS or EIS will be based on the applicability of the criteria in Appendix A of the ACHP's regulations. (**0036-1** [Duvall-Gabriel, Najah])

Response: *If the staff determines that the proposed undertaking will adversely affect properties listed, or eligible for listing, on the National Register of Historic Places (historic properties), the NRC will notify the ACHP in accordance with the consulting requirements. Additionally, in accordance with Section 800.8(c)(2)(i) of 36 CFR Chapter 800, the NRC staff will submit copies of the DEIS and EIS to the ACHP upon completion of the documents. As part of its environmental review of historic and cultural resources, the NRC staff consulted with the Texas Historical Commission (THC) and other appropriate information sources. The results of the analysis will be presented in Chapter 4 of the EIS, and the staff will take any appropriate action called for as a result of this review.*

Comment: The Tonkawa Tribe has no specifically designated historical or cultural sites identified in any of the above listed project areas. However if any human remains, funerary objects, or other evidence of historical or cultural significance is inadvertently discovered then the Tonkawa Tribe would certainly be interested in proper disposition thereof.

We appreciate notification by your office of the many projects on-going, and as always the Tonkawa Tribe is willing to work with your representatives in any manner to uphold the provisions of NAGPRA to the extent of our capability. (**0037-1** [Illegible, Illegible])

Response: *As part of its environmental review of historic and cultural resources, the staff met with the Texas Historical Commission (THC) and other appropriate information sources. The results of the analysis will be presented in Chapter 4 of the EIS, and the staff will take any appropriate action called for as a result of this review.*

Comment: A cultural resource survey should be coordinated with the State Historic Preservation Officer (SHPO). Besides the consideration of listed historical sites, the NEPA document should discuss procedures for events such as unearthing archaeological sites during prospective construction. Such procedures should include work cessation in the area until SHPO approval of continued construction. (**0027-19** [Osowski Morgan, Sharon L.])

Response: *A previously conducted cultural resource survey provided coverage of the area that might be impacted by the proposed project. On February 21, 2007, the Texas State Historic Preservation Officer (SHPO) sent a concurrence letter to the applicant noting that no historic properties would be affected by the proposed action. This letter was referenced in the applicant's Environmental Report and will be included in an appendix of the EIS. Additionally, the NRC staff will discuss the applicant's procedures for dealing with unanticipated archaeological finds in Chapter 4 of the EIS.*

D.2.14 Comments Concerning Environmental Justice

Comment: The proposed new plants would affect low income and minority residents.

- How much will rent go up when the influx of construction workers and their families come to Somervell County?
- Will pollution from construction and operation reach low-income housing areas?

(**0019-25** [Hadden, Karen])

Response: *Effects on housing availability will be addressed in Chapter 4 of the EIS for the construction period and in Section 5 of the EIS for the operations period. Effects on minority and low-income populations specifically will also be addressed in Chapters 4 and 5 of the EIS.*

Comment: Consistent with Executive Order 12898, potential EJ [environmental justice] impacts should be considered in the NEPA document. An EJ survey is to ensure equitable environmental protection regardless of race, ethnicity, economic status or community, so that no segment of the population bears a disproportionate share of the consequences of environmental pollution attributable to a proposed project.

Since uranium mining that occurs in the US may impact tribal lands or environmental justice areas in the western states primarily (including portions of New Mexico and Texas), the potential impacts of increased uranium mining (e.g., in situ leach) and increased exposure of residents should be evaluated. Links between the proposed project and NUREG-19l0 should be included in the NEPA document.

Secondary impacts to low income, minority, and tribal communities concerning the use of the Yucca Mountain repository and transportation routes from the uranium processing facility should also be incorporated.

EPA recommends that the EIS provide clarification regarding resource dependencies or practices, such as subsistence agriculture, hunting, or fishing, through which certain populations could be disproportionately affected. Low-income populations are likely to conduct such subsistence practices. EPA recommends the EIS include a more comprehensive discussion of potential benefits and impacts associated with the project, as it relates to minority and low-income populations and the population at large. (**0027-20** [Osowski Morgan, Sharon L.])

Response: *Impacts on low-income and minority populations residing in the impact region, including impacts associated with subsistence activities in the vicinity of the plant, will be addressed in Chapters 4 and 5 of the EIS. Possible impacts occurring outside the impact region (such as those associated with mining and spent fuel storage) are beyond the scope of this environmental review and will not be addressed in the EIS. Mining, milling, and waste storage operations are all subject to separate regulatory processes.*

D.2.16 Comments Concerning Health - Radiological

Comment: There are routine releases from nuclear plants. Most people don't know this. This is not being adequate addressed, and needs to be, through the environmental impact statement and other avenues. There is no federal standard called a MACT, maximum achievable control technology standard, for radionuclides. That has been done for other industries, for example, for their mercury in the coal plants. That needs to happen. (**0016-21** [Hadden, Karen])

Comment: Right now there are high levels of tritium from this plant, and this needs to be looked into in the environmental impact statement. And they are high compared to other nuclear reactors in the country. (**0016-25** [Hadden, Karen])

Comment: But let's talk about the cancer and the background rate.

It is a simple fact of life that there is background radiation. And then there is also a simple fact of life, since the first above-ground explosions of nuclear weapons, we've increased that background radiation. There's also a simple fact of life that background radiation is higher at every nuclear power facility in the country. And if you double that, it's a simple fact of life that you're going to double background radiation in this community.

I want the environmental impact statement to do an honest analysis and assessment of what that means to the cancer rate in this region. I represent 150,000 people within 50 miles of this facility, and I think it's reasonable to expect that that kind of analysis is done. (**0016-39** [Burnam, Lon])

Comment: I also hope that you'll be looking at issues like release of tritium to the water, the potential—I'm not—I don't know that much about this particular process, because frankly the design hasn't been certified yet, but in terms of—there have been problems in the past with releases of tritium into water at nuclear plants. I don't know if that would be the case in this particular plant. So I would urge you to look at that.

(**0016-53** [Reed, Cyrus])

Comment: I would urge you to look at, you know, there's not a lot of scientific study on what are the impacts of noble gases, which are often released at nuclear plants. But I hope that will be part of your review as well. (**0016-54** [Reed, Cyrus])

Comment: But the problem is, that not only do we have a massive increase of cancer, because of the entire fuel line from the uranium mining, to the fact that we haven't been able to resolve the deposition of the polluted radiation, we have got a gene pool issue. (**0017-10** [Burnam, Lon])

Comment: Why is the tritium level higher here? You have got the problem now with the two facilities. Will two additional facilities make that tritium level even that much higher? (**0017-14** [Burnam, Lon])

Comment: One of my biggest concerns is the risk from the radiation. And the fact that the more radiation that there is, that the greater risk will be to the community. And the Environmental Impact Statement should thoroughly examination all of the radiation health risks.

And no national standard has been set for the radio nucleate emissions, despite the fact that nuclear reactors routinely emit cancer causing radioactivity. And really, no new reactors should be licensed until this standard has been set.

Research has shown an increase in cancer rates around nuclear plants. And Dr. Joseph Mangano of the Radiation and Public Health Project studied the cancer death rate in the three counties closest to the South Texas Nuclear Project. An area that originally had a cancer rate below the statewide rate, in 16 years after the reactors began running, the cancer death rate in the area had risen over 16 percent. (**0017-38** [Rooke, Molly])

Comment: the EIS should research the extent to which the new reactors would add to the cancer risks.

And four reactors at one site would produce significantly more radioactive risks than the two existing reactors.

And what would be the total amount of low level radiation emitted? And how much would surrounding populations be exposed to this? And how much radioactivity would be emitted, just in the routine operations.

And so the EIS should use background radiation levels in their studies and to compare them to construction of the two existing nuclear reactors. And I am concerned about what would happen with the radioactive gasses that would be vented. And not just during the normal operations, but during purges. And I am also concerned about what tritium would be released into the water at the new proposed plant. (**0017-39** [Rooke, Molly])

Comment: Because as you have heard other people say, radiation affects you on a genetic level. It affects your DNA. So what damages your DNA will remain in all of the generations of your family to come. (**0017-62** [Rittenhouse, Ryan])

Comment: from the very beginning to the very end, there is risk of radioactive release. (**0017-69** [Sanders, Jan])

Comment: It hits the genetic mechanism of the human body and messes it up. And it is a slow deformity. But it has been tested out. It has been proven. And so why take the risk? (**0017-71** [Sanders, Jan])

Comment:
The EIS should research the extent to which new reactors would add to cancer risks. Four reactors at one site would produce significantly more radioactive risk than the two existing reactors. What would be the total amount of low-level radiation emitted? How much would surrounding populations be exposed? How much radioactivity would be in routine operations?

The EIS should use background radiation levels not only from before the construction of the two existing nuclear reactors also from before the testing of nuclear weapons in the United States, which resulted in radioactive fallout. (0019-10 [Hadden, Karen])

Comment: Radioactive tritium can leak from nuclear reactors and increase cancer risks. According to NRC reports tritium levels are already high at the Comanche Peak site compared to other reactor sites. What would adding more reactors do to the already high levels of contamination? (**0019-15** [Hadden, Karen])

Comment: The Environmental Impact Statement (EIS) should thoroughly examine radiation health risks. (**0019-9** [Hadden, Karen])

Comment: Comanche Peak Units 1and 2 already utilize Squaw Creek Reservoir as a discharge water body that receives radionuclides including tritium and radioactive particulates. Dr. Arjun Makhijani, president of the Institute for Energy and Environmental Research has noted the relatively high levels of tritium at this site compared to other nuclear reactors, which should be examined and compared to other sites in the EIS, and additional cumulative impacts should be analyzed. (**0022-12** [Hadden, Karen])

Comment: The cumulative impacts on the food chain from the bioaccumulation and bioconcentration of radionuclides discharged from Units 3 and 4 should be considered in terms of the public health implications and the mortality and morbidity calculations related thereto should be a part of the EIS. (**0022-29** [Hadden, Karen])

Comment: The EIS for the proposed expansion of Comanche Peak should quantify and speciate the various radionuclides emitted and quantify the total air emissions anticipated as a result of operation of Units 3 and 4 and determine mortality and morbidity consequences thereof. Additionally, because radionuclides are considered a hazardous air pollutant the EIS should analyze radioactive air emissions on a comparative basis with the emissions permitted

under the more relaxed standards applied to Units 1 and 2 and air emissions from Units 3 and 4 under a MACT standard. (**0022-38** [Hadden, Karen])

Comment: Squaw Creek Reservoir should be analyzed for radiological hazards because of radioactive particulates currently discharged from Comanche Peak Units 1 and 2 that are accumulating in sediment and additional radionuclide loading if Units 3 and 4 are operational. (**0022-7** [Hadden, Karen])

Comment: The inevitable increase in radioactive emissions into the environment will not be beneficial. (**0031-4** [Gentling, Suzanne])

Comment: Tritium and other radioactive particulates ... are major concerns for the receiving waters. These must be adequately addressed in light of the additional water discharges from Units 3 and 4 both in the receiving waters, but also downstream. (**0032-8** [Reed, Cyrus])

Response: *The EIS will address the human health impacts of exposure to radiological effluents from the existing and proposed Comanche Peak units in Section 5.9 of the EIS.*

Comment: We need to look closely at worker exposure. (**0016-22** [Hadden, Karen])

Comment: Risks to employees and area residents should be addressed.

Statements about high doses and low doses of radiation, their potential health effects, and established risk or exposure standards should be included in the NEPA document. (**0027-5** [Osowski Morgan, Sharon L.])

Response: *Occupational radiation exposure will be discussed in Chapter 5 of the EIS. Radiation exposure to construction workers will be addressed in Chapter 4 of the EIS.*

Comment: According to the Nuclear Information and Resource Service, the "Use of MOX fuel attacks commercial nuclear reactors where they are the weakest ... Because of its high neutron flux levels, the reactor pressure vessel can become embrittled and fail during accident conditions. A nuclear accident involving MOX fuel could cause a meltdown more serious than Three Mile Island or Chernobyl, because the levels of radiation inside a reactor using MOX are even higher than in a normal atomic reactor." These increased risks and the related increased worker and terrorism risks and potential resulting economic impacts from utilization of MOX fuel should be included in the EIS. (**0022-26** [Hadden, Karen])

Response: *Luminant has stated that it does not plan to use mixed-oxide fuel. If at some future date, Luminant should decide to use mixed oxide fuel at the Comanche Peak plant, the NRC staff would conduct a safety and environmental review of the proposal.*

Comment: The Comanche Peak environmental report at p. 5.7-3 concedes the fact that there is presently no means by which to dispose of high-level waste. Management of high-level waste on-site is limited to spent fuel pools or dry cask storage units. Alternatively, the environmental report suggests that for plants with inadequate wet or dry on-site storage capacity, spent fuel could be transferred off-site to another plant that has adequate storage capacity available. The EIS therefore, must consider the long-term environmental and public health consequences of spent fuel remaining on site at Comanche Peak indefinitely. A federal repository for spent fuel has not been approved and the prospects for such are, at best, problematic. Long-term spent fuel management on-site represents risks that are not fully assessed in the environmental report. ... Even if the dry cask storage units are not breached they still represent significant long-term sources of radiation. These radiation measurements should be calculated and added to the current projections for exposures to the extent that the environmental report understates such based on the assumption that spent fuel will eventually be moved off-site. The EIS should

assume that the dry cask storage units will remain on Comanche Peak's site indefinitely and make radiation exposure projections accordingly. (**0022-40** [Hadden, Karen])

Response: *Discussions of the estimated dose to construction workers and the public, including doses from dry cask storage, will be found in Chapters 4 and 5 of the EIS.*

Comment: I would love to see the issue addressed about Kleberg County, where the ground water currently contains unsafe levels of uranium and the EPA strongly advises against drinking it.

It is not just about your counties. It is about Kleberg County. (**0017-17** [Burnam, Lon])

Comment: The Environmental Protection Agency has warned residents of Kleberg County that their groundwater currently contains unsafe levels of uranium, and strongly advises against drinking it. (**0019-27** [Hadden, Karen])

Response: *The NRC will consider this information as part of the evaluation of cumulative impacts of the existing and proposed Comanche Peak units in Chapter 7 of the EIS.*

Comment:

In 1980 the NRC conducted a study of what would happen under a worst-case scenario accident at each nuclear plant site. The Comanche Peak estimates were

- 1210 early deaths (25 mile radius around plant)
- 13,800 early injuries (35 mile radius)
- $117 billion (1980 dollars) in financial consequences

The EIS should update these risk figures and include the analysis in the report, taking into account the current population since the area has grown significantly since 1980 and since there would be two additional reactors at the site.

The National Academy of Sciences has concluded that radiation is dangerous even at low levels (BEIR VII study). While low-level radiation exposure is not as damaging as high-level radiation on a short-term basis, prolonged exposure to low-level radioactivity can be just as damaging to humans. The EIS should research the extent to which new reactors would add to cancer risks, birth defects and genetic impacts.

The EIS should include analysis of how much radioactivity would be released in routine operations and the frequency of releases that would occur.

Original background radiation levels should be included in the report. Data or radiation estimates from before the two existing nuclear reactors were constructed should be included, as well as calculations of the true original background level that was present before the testing of nuclear weapons in the United States, and the radioactive fallout that resulted. (**0022-30** [Hadden, Karen])

Response: *The NRC will evaluate the human health impacts of exposure to radiological effluents from the existing and proposed Comanche Peak units in Section 5.9 of the EIS. The NRC will evaluate the human health risks of severe accidents in Section 5.10 of the EIS.*

Comment: The Comanche Peak environmental report relies on data from Table S-3. P. 5.7-17. However, Table S-3, fails to consider health effects from radioactive effluents and further does not estimate releases of either Radon-222 or Technetium-99. The Comanche Peak environmental report does discuss the dose commitment estimates of both RN-222 and TC-99.

However, there is no analysis of mortality or morbidity consequences related to conditions of either radionuclide. The EIS should consider the mortality and morbidity consequences related to the emissions of all the radionuclides anticipated from the routine operations of Comanche Peak Units 3 and 4. Mortality and morbidity analyses should also occur for accident scenarios involving releases of radionuclides from Comanche Peak Units 3 and 4. (**0022-36** [Hadden, Karen])

Comment: The EIS for the proposed expansion of Comanche Peak must account for increased quantities of radiological waste streams and the environmental impacts and public health consequences thereof. The environmental report fails to fully quantify the environmental impacts and public health consequences and omits altogether mortality and morbidity analyses associated therewith. A proper EIS must account for environmental and public health consequences associated with increased quantities of radioactive waste originating at Units 3 and 4. This analysis should include disposition of large plant components such as steam generators that may require replacement before expiration of the reactors' useful lives. Replacement and disposition of steam generators is not a far-fetched or speculative possibility. The Trojan nuclear plant in Oregon replaced its steam generators. Trojan's original steam generators were shipped on the Columbia River by barge to a disposition site in Washington state. The EIS related to Comanche Peak should include an analysis of the environmental impacts and public health consequences of replacing steam generators at Comanche Peak Units 3 and 4 including radiological impacts both on-site and off-site. (**0022-37** [Hadden, Karen])

Response: *The impacts of the uranium fuel cycle, including disposal of low-level radioactive waste and spent fuel, will be addressed in Chapter 6 of the EIS.*

Comment: The environmental report indicates that Squaw Creek Reservoir will continue to be the receiving body of water for various discharges from Comanche Peak Units 3 and 4. The Environmental Report concedes that radioactive particulate matter released to Squaw Creek Reservoir in liquid effluents will be deposited into the sediment layer of the reservoir bottom and remain there indefinitely. Comanche Peak NPP Environmental Report, p.5.11-3. In the event of a protracted drought, and inadequate flow into Squaw Creek Reservoir, the sediment layer could become exposed and, if adequately deliquified, would become dust and subject to transport by wind with clear public health and environmental consequences.

Therefore, it is crucial that the EIS include a complete radiological profile of the existing sediment in Squaw Creek Reservoir and an analysis of the cumulative radiological impacts expected from operations on it from Units 3 and 4. This analysis is required in order to fully gauge the environmental and public health impacts from the use of the earthen Squaw Creek Reservoir as a discharge point for radioactive effluent from Comanche Peak Units 3 and 4. Part of this analysis should be an assumption that the Squaw Creek Reservoir dam will at some point fail and release the sediment that is burdened by radioactive particulates. Downstream impacts on water quality, use, and impacts on mortality and morbidity must be a part of a proper EIS. The Squaw Creek Reservoir dam should also be analyzed for structural integrity. Protracted drought, seismic activity, or other natural events have the potential to weaken the dam and if a failure of the structure occurs radioactive sediment could be carried downstream with significant potential for environmental and public health impacts. (**0022-15** [Hadden, Karen])

Comment: Because the Comanche Peak nuclear plants discharge radioactive effluent into the Squaw Creek Reservoir that drains into the Brazos River and Paluxy River, the EIS should quantify the mortality and morbidity impacts, potential cancer and birth defect increases and genetic damage from exposure to radioactive water by municipal and other users. This analysis should include consideration of the public health and environmental consequences of a failure

of the Squaw Creek dam and the transport downstream of radioactive particulates in the reservoir's sediment. (**0022-35** [Hadden, Karen])

Response: *The NRC will evaluate the human health impacts of exposure to radiological effluents from the existing and proposed Comanche Peak units in Section 5.9 of the EIS. This evaluation will include exposure to radionuclides expected to be deposited in the sediments of Squaw Creek Reservoir during routine operation. The other dose pathway scenarios postulated by the commenters are very unlikely and will not be addressed in the EIS.*

D.2.17 Comments Concerning Accidents - Design Basis

Comment: I would like to request an explanation of how it is safe to build and operate new nuclear reactors prior to the implementation of the same post 9-11 security hardening requirements that existing nuclear reactors have that has not been done. Without this in place, there are risks to the environment that are increased. This should be analyzed in the Environmental Impact Statement. If they can do this at existing reactors, why not new ones? (**0017-26** [Hadden, Karen])

Response: *Comments related to security and terrorism are safety issues that are not within the scope of the staff's environmental review. The NRC is devoting substantial time and attention to terrorism-related matters, including coordination with the Department of Homeland Security. As part of its mission to protect public health and safety and the common defense and security pursuant to the Atomic Energy Act, the NRC staff is conducting vulnerability assessments for the domestic utilization of radioactive material. Since the events of September 2001, the NRC has identified the need for license holders to implement compensatory measures and has issued several orders to license holders imposing enhanced security requirements. Finally, the NRC has taken actions to ensure that applicants and license holders maintain vigilance and a high degree of security awareness. Consequently, the NRC will continue to consider measures to prevent and mitigate the consequences of acts of terrorism in fulfilling its safety mission. Additional information about the NRC staff's actions regarding physical security since September 11, 2001, can be found on the NRC's public web site http://www.nrc.gov.*

Comment: Luminant is adding two reactors on top of two existing reactors and the cumulative impacts of all four units must be addressed ... . In addition, the impacts of any minor or major accident at one unit on other units must be addressed. (**0032-10** [Reed, Cyrus])

Response: *The frequency and consequences of accident scenarios that lead to radiological consequences are determined through the use of probabilistic risk assessment techniques. In accordance with MHI, LTD., "U.S-APWR Probabilistic Risk Assessment (Level 3)," MUAP-8004-P (R1), the estimated CDF for Comanche Peak 3 and 4 is 1.2E-06 per year per unit and the sum of all containment release frequencies is 1E-07 per year per unit. Therefore, the frequency where a severe accident could potentially impact the operating units is approximately 2E-07 per year. Because this frequency is below the screening criteria (1E-06 per year) for initiating events contained in ASME/ANS RA-S-2008, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," Supporting Requirement IE-C4, its impact on the operating units would not be considered to be material. The impact of accident scenarios associated with the current units, Comanche Peak 1 and 2, on the proposed units, Comanche Peak 3 and 4, is not considered to be in-scope of the current EIS. Cumulative impacts will be addressed in Chapter 7 of the EIS.*

Comment: The evaluation methodology utilized in the Comanche Peak environmental report for design basis accidents is flawed. P. 7.1-1. The postulated loss of cooling accident assumes that there will be a lower magnitude of radioactivity releases than a worst-case scenario

assumes. The EIS should approach a loss of cooling accident from the perspective that a complete loss of radioactive inventory will occur. A complete loss of radioactive inventory should be the base assumption for determining anticipated doses that may be received by the public. Accordingly, the EIS should not adopt the Comanche Peak environmental report evaluation methodology for design basis accidents and should assume a worst-case scenario that includes a complete release of all radiation from both Units 3 and 4. (**0022-47** [Hadden, Karen])

Response: *The staff's position is that the assessment of design basis accidents is based on conservative assumptions and calculations used in NRC safety evaluations as stated in Section 15 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants." This conservative assessment is used to establish performance requirements of the plant's engineered safety features. Among the conservative assumptions used pursuant to the Section 15 analysis is the use of adverse meteorological dispersion conditions (i.e., 95th percentile X/Q). As actual consequences will likely be far less severe than those given for the same events, design basis accidents are evaluated using more realistic meteorological conditions (50th percentile site-specific X/Q values). The evaluation methodology used in the Comanche Peak environmental report is consistent with this approach. In addition, existing requirements provide assurance that the probability of simultaneous accidents at multiple units would be substantially less (e.g., over an order of magnitude) than the probability of accidents involving a single unit. For example, 10 CFR Part 50, General Design Criterion 5, "Sharing of structures, systems, and components," requires that structures, systems, and components important to safety not be shared unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cool down of the remaining units. Also, a plant- and site-specific probabilistic risk assessment (PRA) will be required prior to operation of any future plant pursuant to 10 CFR 50.34(f)(1)(i). This PRA will determine whether the risk from the as-built units will be low and will account for any inter-unit dependencies. In contrast, the consequences associated with an accident involving multiple units (e.g., a multi-unit core-melt accident) could reasonably be expected to be only marginally greater than for a single unit event. For example, given the same accident release characteristics for both units, the total releases from two reactor cores (and the associated accident consequences) would, as a first-order-of-magnitude approximation, be about twice that for a single unit. The substantially lower frequency of a multiple unit accident would more than offset the potentially greater consequences of the multiple unit accident. Thus, the risk associated with multiple, simultaneous accidents would be a negligible contributor to the overall risk from all units on the site. Accordingly, the staff does not plan to address multi-unit accidents as part of the EIS review.*

Comment: Each nuclear reactor design has unique flaws and weaknesses, and experience shows equipment and design failures, as well as areas and situations where human error is likely. The history of similar Pressurized Reactor Water (PWR) reactors in Japan should be considered in the EIS analysis, not just the Design Control Document.

The proposed USAPWR reactor design has never been approved and the design has never been built anywhere in the world, but has been developed from the design used in existing PWR reactors in Japan. Problems with existing PWR reactors there could provide clues to potential problems with Comanche Peak Units 3 and 4, allowing estimation of the likelihood that they could result in any number of environmental and health impacts. Design history should be considered in the EIS. (**0022-54** [Hadden, Karen])

Comment: The proposed Mitsubishi reactors are of a design as yet untested in the field. This is not reassuring. (**0031-6** [Gentling, Suzanne])

Response: *The EIS will address the potential environmental impacts of postulated design-basis and severe accidents associated with the US-APWR design (the designation used for the design of the proposed Mitsubishi reactors). In a separate action, the staff is evaluating the potential consequences of design-basis accidents and the probability and consequences of severe accidents for the US-APWR as part of its review of the application for certification of the reactor design. A detailed description of the design certification review is beyond the scope of the EIS. However, the staff uses well-established methods to analyze a new design to determine the potential consequences of accidents. The results of the certification review process will be compared to the results of the evaluation of the environmental impacts of potential radiological releases to ensure consistency.*

Comment: The EIS should discuss monitoring of radiation, prevention of releases, and emergency planning procedures in case of an unintended release. (**0027-4** [Osowski Morgan, Sharon L.])

Response: *Radiation monitoring for the existing and proposed Comanche Peak units will be addressed in Section 5.9 of the EIS. Those radiation releases associated with normal operation will be addressed in Section 5.9, and those releases associated with postulated accidents will be addressed in Section 5.10. Section 5.10 also addresses the identification and evaluation of severe accident design and procedural or training mitigation alternatives that can be justified to further reduce the likelihood or consequences of severe accidents. However, emergency planning is outside the scope of the EIS and will not be considered further in the staff's environmental review. An evaluation of emergency planning issues will be part of the safety evaluation report (see 10 CFR 52.18).*

D.2.18 Comments Concerning Accidents - Severe

Comment: There is a whole issue of accident and securlty. Back in 1980, the NRC conducted a study, and they concluded at that time that early deaths—and that's a nice catchword for people that die immediately as opposed to long-term, protracted, strung-out deaths— they estimated early deaths of 1,210 within the first 25-mile radius. They estimated early injuries within a 35-mile radius of 13,800.

They estimated financial consequences—you know, we always talk in the legislative process about the unplanned consequences or the unintended consequences—well, the financial consequences could be in excess of $117 billion.
Well, you know, it doesn't take a brilliant person to figure out that almost 30 years later—it'll be 35 or 40 years later—once this thing, if it's built, is operational, that those early deaths will be far more than that. In part because of the rapid population growth in Hood and Somervell Counties, those early injuries will be far more than that. And those financial consequences to the entire North Texas region will be far more than what you projected back in 1980. So I look for and anticipate an honest and accurate analysis of those problems.
(**0016-41** [Burnam, Lon])

Response: *The EIS will include an evaluation of the risks associated with potential severe accidents, including accidents that involve reactor core melts. The EIS will address the potential consequences of postulated design-basis and severe accidents and will take into account the current and anticipated population growth of the surrounding counties during the projected operational period of these plants. However, comments related to security and terrorism are safety issues that are not within the scope of the NRC staff's environmental review and are regulated by 10 CFR Part 73, "Physical Protection of Nuclear Power and Materials."*

Comment: The risk of a nuclear accident and the magnitude of devastation would increase with more reactors on the site.

... In 1980 the NRC conducted a study of what would happen under a worst-case scenario accident at each nuclear plant site. The Comanche Peak estimates were:

- 1210 early deaths (25 mile radius around plant)
- 13,800 early injuries (35 mile radius)
- $117 billion (1980 dollars) in financial consequences

The Environmental Impact Statement should include a similar study to update these risk figures, since the population of the region has grown and since there would be more reactors. (**0019-11** [Hadden, Karen])

Response: *The EIS will include an evaluation of the risks associated with potential severe accidents, including accidents that involve reactor core melts. The EIS will address the potential consequences of postulated design-basis and severe accidents, and will take into account the current and anticipated population growth of the surrounding counties during the projected operational period of these plants.*

Comment: Additionally, cumulative impacts from accident scenarios should also be considered. For example, the EIS should consider whether a radiological accident, at one plant could interfere/interrupt operations at the remaining plants at the Comanche Peak site. Further, there should be a careful consideration of whether an accident or event at one plant could actually preclude operations at the remaining plants. This is relevant because of the close proximity of the planned Units 3 and 4 to the existing Units 1 and 2. (**0022-28** [Hadden, Karen])

Comment: Luminant is adding two reactors on top of two existing reactors and the cumulative impacts of all four units must be addressed ... . In addition, the impacts of any minor or major accident at one unit on other units must be addressed. (**0032-11** [Reed, Cyrus])

Response: *The frequency and consequences of accident scenarios that lead to radiological consequences are determined through the use of probabilistic risk assessment techniques. In accordance with MHI, LTD., "U.S-APWR Probabilistic Risk Assessment (Level 3)," MUAP-8004-P (R1), the estimated CDF for Comanche Peak 3 and 4 is 1.2E-06 per year per unit and the sum of all containment release frequencies is 1E-07 per year per unit. Therefore, the frequency where a severe accident could potentially impact the operating units is approximately 2E-07 per year. Because this frequency is below the screening criteria (1E-06 per year) for initiating events contained in ASME/ANS RA-S-2008, "Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," Supporting Requirement IE-C4, its impact on the operating units would not be considered to be material. The impact of accident scenarios associated with the current units, Comanche Peak 1 and 2, on the proposed units, Comanche Peak 3 and 4, is not considered to be in-scope of the current EIS. Cumulative impacts will be addressed in Chapter 7 of the EIS.*

Comment: The Comanche Peak emergency evacuation plan assumes that 100% of the affected population from a radiological emergency would be evacuated. p. 7.2-3. The model is further compromised because it does not adequately account for evacuees that are transported 25 miles from the Comanche Peak site as they "disappear" from the emergency evacuation analysis. Id. Accordingly, the results of the dose and dollar risk assessments for severe accident analysis are understated in the Comanche Peak environmental report Table 7.2-5. The EIS should not assume that 100% of the affected population will be evacuated. Rejecting this assumption requires that the data in Table 7.2-5 be adjusted to account for increased dose risk,

dollar risk, early fatalities, latent fatalities, and water ingestion dose risk. Moreover, there should be an accounting for evacuees and the doses to which they have been exposed even if those evacuees are moved 25 miles beyond the Comanche Peak site. (**0022-45** [Hadden, Karen])

Response: *This comment addresses two evacuation model issues that appear to be within the scope of the environmental review: (1) the percentage of population assumed to be evacuated and (2) the treatment of the evacuated population once they are transported over 25 miles. The removal of the evacuated population once they exceed a fixed distance is a standard analysis approach. The distance that is selected (i.e., 25 miles) is a user input. Shorter distances have been used in other analyses. Although a sensitivity analysis has not been performed, it is believed that the any additional dose that would be received by this evacuated population would not be material.*

Comment: And that, because of this, the other factor is that part of that energy bill said that if there is some kind of a dangerous, let's say, explosion or something happens that ruins the area around here, who is going to pay for it? We are. Because they put some things into the energy bill that does not require the company to be 100 percent responsible for the cleanup for it. It will be the taxpayers. And the people in Congress have been lowering the standards for that. So it all falls back on us. (**0017-51** [Harper, Debbie])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. These comments provide no new information and were not considered further. This comment provides no information related to the scope of this EIS and will therefore not be considered further in the staff's environmental review.*

D.2.19 Comments Concerning the Uranium Fuel Cycle

Comment: There are so many ways to build the local economy more effectively and not put anyone at risk from radioactive fuel, from handling it, from trying to store it. Right now it's being stored on site, and it appears that that would be the continuing manner in which the radioactive waste is handled, because we don't have a national repository. That's of huge concern. (**0016-16** [Hadden, Karen])

Comment: I want this assessment to include an evaluation of what we do with the radioactive waste. It's still on site. You all know when this facility started operating in the early '90s, it's still on site. It doesn't seem like we're any closer than we were in that time frame to get a permanent waste repository. What are we going to do with this radioactive waste and material? (**0016-40** [Burnam, Lon])

Comment: I'd also like to make it clear that while people in Somervell and Granbury may feel like it's been relatively clean and unharmful to them, they don't live where the uranium is mined. And I guarantee you, if you talk to the tribal leaders in New Mexico, you'll find out that it is not a clean process. And the cancer rates on the tribal lands where this uranium is taken from have gone up exponentially as a result of the mining. So from the beginning of the process to the end of the process, we've yet to have an honest analysis of the environmental impact on health and safety. (**0016-44** [Burnam, Lon])

Comment: And finally, I hope you're going to look at the whole cycle. While we're talking about a license for a particular plant to basically boil water, it involves a whole cycle of uranium. And 'I would hope that your assessment will look at that whole cycle, where the uranium will come from and where the results of using the uranium will go, as part of your assessment. And so I would urge you to do that. (**0016-55** [Reed, Cyrus])

Comment: For many years I've been concerned about nuclear power and the problem that we seem to ignore, what to do with the waste. I think we really need to look at that very, very carefully. (**0016-60** [Wildwood, Kathleen])

Comment: But there is no mention of the waste, the radioactive waste, which is a problem. I don't think anyone can deny that. (**0017-36** [Cohn, Ann])

Comment: So radioactive low level and high level waste is spewed out as it is being mined. It is at risk when it is being transported, if there is a wreck. There is risk in the actual production of the energy. And then there is a risk as it is put into the waste areas. The full chain is risky. (**0017-70** [Sanders, Jan])

Comment: One is the waste. We know the fact that we are drowning worldwide under nuclear waste. We do not have a safe means of having them stored. Of course, everyone will mention Yucca Mountain. Yucca Mountain is still a no-go. There have been reports of more problems with Yucca Mountain of leakage. It is not a safe place. We don't have something else to take its place. And this stuff is toxic for thousands of years. (**0017-75** [Stuard, Gary])

Comment: In the last ten years, the Texas Department of Health Services has cited several instances of radioactive waste spills by uranium mining companies, including Cogema Inc.'s 1998 spill of over 20,000 gallons of radioactive solution in Bruni, Texas. (**0019-26** [Hadden, Karen])

Comment: The uranium fuel cycle has substantial greenhouse gas impacts that should be considered at each phase of the fuel cycle.

The uranium fuel cycle is a contributor to greenhouse gases. The EIS should carefully consider and include in its analysis the greenhouse gas impacts that are unavoidable as a result of mining, processing, fabrication, transportation fuel burn up, waste streams management, decommissioning and long-term site maintenance that are an integral part of the uranium fuel cycle. While the proponents of an expanded Comanche Peak nuclear plant posit that there will be fewer greenhouse gases produced as a result of the operations of Comanche Peak Units 3 and 4 compared to fossil fueled plants, there are inevitable greenhouse gas emissions associated with each phase of the fuel cycle. These conditions need to be carefully considered to determine the full impact of an expanded Comanche Peak nuclear plant.
The decision in Massachusetts V. EPA, 549 U.S.497 (2007) requires that carbon dioxide be considered a pollutant. Carbon dioxide emissions are inevitable in the production of fuel for nuclear plants. Likewise, carbon dioxide emissions can be anticipated during routine operations of a nuclear plant and are foreseeable as a plant is decommissioned. Any benefits derived by operation of a nuclear plant in terms of avoidance of greenhouse gases needs to be considered in light of greenhouse gas production as it occurs in various stages in the fuel cycle. An adequate EIS should require such an analysis. (**0022-3** [Hadden, Karen])

Comment: Each part of the uranium fuel cycle has substantial radiological, environmental and public health impacts that are cumulative in nature and should be considered in the context of an EIS.

Each phase of the uranium fuel cycle has radiological, environmental and public health impacts that must be analyzed and quantified in the context of an EIS. For example, mining uranium is known to cause an increase in radiation related illnesses among miners. Mortality and morbidity analyses should be done for uranium mining and associated activities related to supplying fuel to Comanche Peak Units 3 and 4. (**0022-4** [Hadden, Karen])

Comment: radioactive waste would be stored onsite since there is still no national nuclear waste repository. (**0030-6** [Hadden, Karen])

Response: *Impacts related to the uranium fuel cycle and its transportation steps, including disposal of low-level radioactive waste and spent fuel, will be addressed in Chapter 6 of the EIS. The generic impacts of the fuel cycle are codified in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data." Per the guidance in 10 CFR 51.51 and Section 5.7 of NUREG-1555, the staff will rely on Table S-3 as a basis for uranium fuel cycle impacts. The safety and environmental effects of long-term storage of spent fuel on site have been evaluated by the NRC and set forth in the Waste Confidence Rule at 10 CFR 51.23 (http://www.nrc.gov/reading-rm/doc-collections/cfr/part051/part051-0023.html).*

Comment: Based on the assumption that Comanche Peak Units 3 and 4 will utilize MOX fuel, careful analyses of the radiological and public health impacts associated with MOX fuel fabrication should be a part of the EIS.

MOX fuel fabrication has remote handling requirements not associated with uranium fabrication facilities. MOX fuel includes plutonium, a strong alpha emitter, that has a higher specific radioactivity than uranium. The plutonium, if inhaled, presents a well-recognized health hazard. A MOX fuel fabrication facility, while subject to more stringent requirements than a uranium fuel fabrication facility, still involves handling increased amounts of plutonium. The environmental and public health impacts associated with increased use and handling of plutonium should be a part of a proper EIS. CP Environmental Report, page 5.7-4. The EIS should include environmental impacts associated with routine operations of a MOX fuel fabrication facility as well as accident scenarios that could involve such a facility. (**0022-25** [Hadden, Karen])

Comment: Our understanding is that in addition to uranium, the Comanche Peak facility will utilize MOX fuel fabrication, which in itself will lead to other environmental and public health challenges which must be addressed by an EIS. (**0032-4** [Reed, Cyrus])

Response: *The COL submitted by Luminant for CPNP Units 3 & 4 is for reactors fueled with uranium oxide only. Any future use of MOX fuel would be covered in separate license amendment process. For this reason the environmental effects of MOX fuel will not be covered in the EIS.*

Comment: The Comanche Peak environmental report recognizes that there has been an overall reduction of the demand for uranium fuel and the elimination of legal restrictions on importation of foreign uranium which has caused the closing and decommissioning of most domestic uranium mines and mills. The economic conditions pertaining to the uranium market favor utilization of foreign uranium rather than uranium mined in the United States. The Comanche Peak environmental report suggests that these changes have made uranium mining and milling and enrichment more "environmentally friendly". p. 5.7-4. However, there is no analysis in the environmental report of environmental or public health impacts of mining and milling uranium in foreign countries. The EIS should include a full analysis of the impacts of mining and milling uranium in foreign countries.
(**0022-31** [Hadden, Karen])

Response: *The NRC environmental review process only covers environmental effects in the United States. The comment above requests the review of mining operations outside the US. Since such review is outside the legal scope of this NRC licensing process, such effects will not be covered in the EIS.*

Comment: Nuclear waste is not our solution to energy independence. It has health impacts. (**0016-24** [Hadden, Karen])

Comment: One other concern I will just touch on is, that the contamination from the uranium, what would happen in building more nuclear reactors, is there would have to be more uranium brought in, of course. And it might be something that the local community isn't thinking as much about. But there are other local communities even in Texas that are very concerned about that. (**0017-45** [Rooke, Molly])

Comment: And that is the radioactive waste that is stored here in Somervell County. We take our garbage to the local dump. Or if you live in the city, you have it picked up, because the city provides that service. And then it is transported off to somewhere else. Yet we keep our radioactive waste here.

Yucca Mountain is not open. And we want to expand the amount of radioactive waste we are actually going to store here in this county, by opening these new plants. I don't think it is such a wise move to keep increasing the size of the radioactive waste, without figuring out what to do with it first. (**0017-48** [Harper, Paul])

Comment: No high or low-level waste sites are available.

- Nuclear reactors produce tons of high and low-level radioactive waste that remains dangerous to living beings for tens of thousands of years. Radioactive and toxic waste is produced at every stage of the fuel cycle, including routine plant operations.
- Federal law prohibits the licensing of any new nuclear plant until there is an adequate waste disposal plan. Nuclear plants have been operating for 50 years, but the waste disposal problem has not been solved. Radioactive waste remains stored onsite at reactors across the county.
- There is no national storage facility for high-level radioactive waste and the Yucca Mountain repository is unlikely to open in the near future. The Associated Press wrote: "The Energy Department is cutting operations and the chief contractor is laying off its staff at the desert site where the government plans to build a national nuclear waste repository..." Jan 8, 2008.
- The Andrews County low-level waste dump application has been deemed incomplete by the Texas Commission on Environmental Quality.
- The impacts and risks of storing additional high -level radioactive waste on site needs to be studied thoroughly in the EIS. The long-term cumulative health impacts of additional low-level radiation need to be studied thoroughly and included in the environmental impact study as well. Impacts on humans, wildlife and plant life need to be considered, with special attention given to threatened and endangered species.
- The EIS should study the additional safety and security risks of more radioactive waste.
- The license for two new reactors at Comanche Peak, or any other reactor, should not be issued since there is no effective resolution of the storage issue.

(**0019-30** [Hadden, Karen])

Comment: There is a resurgence of uranium mining in South Texas at this time, with nineteen exploration permits being pursued. Impacts on communities in Texas including drinking water contamination which should be researched and examined thoroughly in the EIS. New mining operations are being pursued even though aquifers contaminated by earlier mining operations have not been restored and some residents in Texas still cannot drink their water due to contamination. Adding two more reactors at Comanche Peak would likely impact the amount of mining in South Texas and environmental and health impacts in those communities should be analyzed and considered thoroughly in the EIS. (**0022-34** [Hadden, Karen])

Comment: The Comanche Peak environmental report assumes that so-called low-level radioactive waste will be disposed of at land burial facilities. Based on this assumption, the environmental report assumes that there will be no significant radioactive releases to the environment. p. 5.7-8.This assumption is dubious at best considering that low-level radioactive waste streams contain very long-lived radionuclides that would not be adequately sequestered in land burial facilities for the duration of their hazardous lives.

Moreover, the availability of land burial sites is problematic. Attempts to establish new land burial sites for the so-called low-level radioactive waste stream have largely been unsuccessful. The sites that were planned for Nebraska, California and Texas have been rejected in the past and the TCEQ decision to issue a state permit for a site in West Texas is likely to be appealed, so it should be assumed in the EIS that there will be no off-site capacity to dispose of the so-called low-level radioactive waste stream. The EIS should consider the long-term environmental and public health consequences of managing the so-called low-level radioactive waste stream on the Comanche Peak site. The analysis of this issue should include an analysis of radiation exposures to employees and the public based on the assumption that the low-level radioactive waste stream will not be disposed of off-site. (**0022-43** [Hadden, Karen])

Comment: The Comanche Peak environmental report assumes that there will be no significant radioactive releases to the environment related to off-site disposal of the radioactive waste streams that originate at Units 3 and 4. p. 5.7-8. The EIS should not adopt this assumption. The EIS should fully consider the public health and environment consequences of major releases to the environment of radioactive materials as a result of off-site disposal activities. The off-site releases could originate from on-site processing, transportation accidents, off-site processing, and long-term releases from the disposal site because of either improper or inadequate waste site characterization, natural events such as earthquakes, and intentional or unintentional releases. Irrespective of the cause of the releases such should be considered for the impacts to the environment and public health consequences. (**0022-44** [Hadden, Karen])

Comment: The only existing solution to the toxic waste issue is to bury it somewhere. I've read that West Texas is currently being identified as a depository. Storage and transportation of these wastes is simply a disaster waiting to happen and is an irresponsible choice for our environment and for future generations. (**0031-5** [Gentling, Suzanne])

Comment: The EIS must address the complete uranium cycle from cradle to grave and the impacts of that cycle. Where will the plant obtain its raw uranium for the life of the plant? Where will it be processed? Enriched? Deconverted? What are the impacts of the mining, processing and enrichment processes in their place of origin?

What happens to the waste streams along the way during that process, including at the end of the uranium cycle. Each part of the uranium fuel cycle has environmental, radiological and public health impacts that must be addressed. (**0032-3** [Reed, Cyrus])

Response: *The impact of the uranium fuel cycle and its transportation steps, including disposal of low-level radioactive waste and spent fuel, will be addressed in Chapter 6 of the EIS. The generic impacts of the fuel cycle are codified in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data." Per the regulation in 10 CFR 51.51 and guidance in Section 5.7 of NUREG-1555, the staff will rely on Table S-3 as a basis for uranium fuel cycle impacts. The safety and environmental effects of long-term storage of spent fuel on site has been evaluated by the NRC and, as set forth in the Waste Confidence Rule at 10 CFR 51.23 (available at http://www.nrc.gov/reading-rm/doc-collections/cfr/part051/part051-0023.html), the NRC generically determined that "if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the*

licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite of offsite independent spent fuel installations. Note that the waste confidence decision is being updated through rulemaking and references to the timing of repository availability is being omitted in the updated version. It is outside the scope of this EIS to address specific low-level waste burial locations, existing or proposed. Site specific data for these locations is developed as part of the NRC licensing process under 10 CFR 61.

Comment: Are we willing to bank on the fact that governments will still be in place thousands of years from now? How many have lasted thousands of years? Are we willing to put our children's children's children at risk because we couldn't figure out a smarter way to use our energy and to generate it? And those smarter ways exist right now, and they create jobs, and they're better for our economy. (**0016-18** [Hadden, Karen])

Response: *Chapter 6 of the EIS will address the impacts of the fuel cycle, including radioactive wastes.*

Comment: I'm also interested in sustainability, and uranium is not a sustainable product. (**0016-75** [Shaar, Julie])

Comment: Dependence on foreign sources for uranium should also be considered in the EIS as a potentially harmful environmental and public health consequence. Recent experience with dependence on foreign sources for oil has heightened awareness that supplies may be interrupted or artificially inflated in costs. The economic impacts from such dependence can be far ranging and adverse. Accordingly, such impacts should be considered in a proper EIS. (**0022-32** [Hadden, Karen])

Response: *The sufficiency of the supply of uranium for nuclear power plant fuel will be addressed in Chapter 6 of the EIS.*

Comment: Nuclear, the mining associated with nuclear power, the uranium mining is incredibly destructive. And it is killing people, literally killing. people. (**0017-63** [Rittenhouse, Ryan])

Comment: And waste [of] waste. (**0017-67** [Sanders, Jan])

Comment: It was pointed out that in Texas, we are kind of in the zero target in relation to nuclear, because there are a lot of uranium deposits in Texas. (**0017-68** [Sanders, Jan])

Response: *The impacts related to the uranium fuel cycle will be addressed in Chapter 6 of the EIS. The generic impacts of the fuel cycle are codified in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data." Per the guidance in 10 CFR 51.51 and Section 5.7 of NUREG-1555, the staff will rely on Table S-3 as a basis for uranium fuel-cycle impacts.*

D.2.20 Comments Concerning Transportation

Comment: The effect of the increased truck traffic, noise and pollution levels from a construction project of this size on an infrastructure that is already pushed to the limit would not be desirable to humans or wildlife. (**0031-7** [Gentling, Suzanne])

Response: *Impacts of plant construction and operation on the use of existing local infrastructure including transportation networks, noise and pollution levels, and other community services or the need for such new infrastructure will be addressed in Chapters 4 and 5 of the EIS.*

D.2.21 Comments Concerning Decommissioning

Comment: The reality is the two now are halfway through their life cycle. They'll be closed down. They'll be moth-balled. And in the 50 years of the operation of nuclear power plants, we still have not resolved that issue. So any real, accurate environmental impact statement will have a very careful analysis of the implication of storing this material on site forever. (**0016-38** [Burnam, Lon])

Comment: Additionally, given the very long-term nature of the radiological hazard represented by the accumulation of radioactive particulates discharged during plant operations, it should be assumed that the reservoir will require, at the minimum, management and perimeter security for a time that extends far beyond the term of operation license. Questions surrounding post-license ownership of and responsibility for Squaw Creek Reservoir should be addressed and resolved in the EIS. Accordingly, the EIS should fully consider the structural reliability of the Squaw Creek Reservoir dam and analyze adverse environmental and public health consequences that could occur as a result of its failure. (**0022-16** [Hadden, Karen])

Comment: The Comanche Peak environmental report acknowledges that it does not provide anything more than an initial projection of expected future environmental impacts related to decommissioning. The details related to environmental impacts expected from decommissioning are put off to a future unspecified date. The Comanche Peak environmental report assumes impacts related to decommissioning are either negligible or require, at most, a site-specific assessment. However, the environmental report assumes that site-specific and off-site land use activities and aquatic ecology activities beyond the operational area, terrestrial ecology activities beyond the operational area, threatened and endangered species, environmental justice, and cultural historic resource impacts beyond the operational area are expected to be negligible. However, there is no analysis in the environmental report whatsoever of any of these impacts either from a public health or environmental consequence standpoint. p. 5.9-1. Accordingly, a proper EIS should carefully consider decommissioning impacts including the likelihood that a decommissioned plant will be disassembled and transported to a site that will be the recipient of highly irradiated materials. Additionally, the EIS should consider contingent possibilities that off-site removal of a decommissioned nuclear plant will not be a practicable alternative. In that scenario, the environmental consequences and public health impacts of the in situ, long-term radioactive decay of Comanche Peak Units 3 and 4 should be considered in the EIS.

Decommissioning has its own waste stream issues, as well. The EIS should consider the radiological and public health impacts from the various decommissioning waste streams and environmental justice and other implications of disposition of highly irradiated materials off-site. Additionally, the EIS should consider whether off-site disposition of decommissioning materials is even feasible. The decommissioning of nuclear plants is an evolving technology, and the land use, environmental and public health implications of decommissioning activities are not well understood. The EIS should fully analyze the probability that there will be significant resistance to transportation and disposition of highly irradiated decommissioned plant materials to a remote site.

Moreover, in promotional materials published by the reactor manufacture Mitsubishi, it is acknowledged that technology for decommissioning is still in the process of being developed. Mitsubishi Nuclear Plants, p. 27. Hence, there is currently inadequate technology to carry out decommissioning. The assumption appears to be that adequate technologies will be developed in the future. However, a proper EIS should consider the scenario that adequate technologies for decommissioning are not developed in the future or proved to be inadequate for the task. The EIS should take into account contingencies that would require long-term secure storage of

Comanche Peak Units 3 and 4 because either decommissioning technology is inadequate [or] where there is no remote site available for the disposition of wastes from decommissioning activities. This analysis would require a consideration of radiological impacts related to the long-term delay in decommissioning, as well as public health and environmental consequences related thereto. (**0022-39** [Hadden, Karen])

Comment: These enormous, single-purpose facilities have a limited life and store on site their partially-spent fuel. What provisions will be made for de-commissioning, with removal of all structures and hazardous materials, together with restoration of the site? (**0028-3** [Inge, Charles and Dominique])

Comment: The EIS should examine both the Texas and federal decommissioning procedures, as well as the funds set up to pay for decommissioning to assure that adequate monies exist to pay for any clean up and decommissioning and the public is not, as it has on multiple occasions, held responsible for these costs. How a merchant plant selling power on the wholesale market will be paid for is of serious concern. (**0032-18** [Reed, Cyrus])

Response: *NRC regulations establish a framework to ensure that decommissioning of all nuclear reactor facilities will be accomplished in a safe and timely manner and that funding will be available for this purpose. Federal regulations (10 CFR 50.33(k) and 10 CFR 50.75(b)) require an applicant for a COL license to certify that sufficient funds will be available to ensure radiological decommissioning at the end of power operations. The financial decommissioning funding assurance mechanism analysis will be in the SER not the EIS. The environmental impact from decommissioning a permanently shutdown commercial nuclear power reactor is discussed in Supplement 1 to NUREG-0586, Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, which was published in 2002. If fuel is maintained onsite in an Independent Spent Fuel Storage Installation (ISFSI), a license for the ISFSI will be maintained and any required security and monitoring would be provided by the ISFSI licensee. Evaluation of such a facility is not within the scope of this EIS. The Squaw Creek Reservoir is an existing site feature constructed for Comanche Peak 1 and 2. The evaluation of the impacts and maintenance of the Squaw Creek Reservoir dam is not within the scope of this EIS.*

Comment: Additionally, given the very long-term nature of the radiological hazard represented by the accumulation of radioactive particulates discharged during plant operations, it should be assumed that the reservoir will require, at the minimum, management and perimeter security for a time that extends far beyond the term of operation license. Questions surrounding post-license ownership of and responsibility for Squaw Creek Reservoir should be addressed and resolved in the EIS. (**0022-17** [Hadden, Karen])

Response: *The NRC regulations require the decommissioning of all nuclear power facilities. The licensee remains responsible for the site until the entire site is surveyed and released for unrestricted use.*

D.2.23 Comments Concerning Cumulative Impacts

Comment: The simple fact that you'll have twice as many reactors, the large visible target of the cooling towers, twice as much transportation issues, both for bringing the radioactive material in and dealing with it, if you ever choose to deal with it, off site, taking it off site. All of those are kind of geometrically increased problems over the two. (**0016-37** [Burnam, Lon])

Comment: But this is one thing that needs to be looked into. There's just something wrong. And if you add another power plant or two, to me, that would increase the flow of the—it would also increase the temperature of the water.

The water, I understand, it has—can't reach a certain temperature. But when they release that water, it's too hot. You need to release the water some way where it's not as hot, or find some cooling system after you release that water. I think it would help the situation. (**0016-65** [Cathey, Jack])

Comment: Adding two 1600 MW reactors to a site that has already been impacted by continued operation of Comanche Peak Units 1 and 2 will result in unprecedented concentrations of reactor operations. The cumulative impacts of operational releases of radiation from four operating reactors should be a part of a proper EIS. (**0022-27** [Hadden, Karen])

Comment: The NEPA document should estimate cumulative impacts of resources of concern associated with the proposed project. Cumulative impacts include the additive effects of a given parameter for all contributing projects in the study area and watershed. The document should define what cumulative impacts would result from implementation of the proposed project. Existing or future projects (Federal and non-Federal projects) with attendant pollutants should also be considered. (**0027-25** [Osowski Morgan, Sharon L.])

Comment: Luminant is adding two reactors on top of two existing reactors and the cumulative impacts of all four units must be addressed in terms of water discharges, air borne radioactivity, and radioactive waste. (**0032-9** [Reed, Cyrus])

Response: *Cumulative impacts are the impacts that result from the combination of the proposed action and past, present and reasonably foreseeable actions, regardless who takes the actions. The cumulative impacts associated with the construction and operation of the proposed Units 3 and 4 will be evaluated for each affected resource. The results of cumulative impact analyses will be presented in the Chapter 7 of the EIS.*

Comment: One last thing that I will mention in relationship to this global warming stuff, is there is also global warming on the thermal level. You know, it is not just how much C02 we are putting out into the atmosphere. It is actually the active heating of our planet by burning stuff. And that is something that isn't talked about very much. But that is what is referred to as the thermal load of the facility. And a nuclear plant has about three times the thermal load of a coal plant. The heat it emits and the water that it heats up is three times the amount of the average coal plant. So that is also something to consider.

(**0017-65** [Rittenhouse, Ryan])

Response: *Contributions of both direct heat emissions and greenhouse gases to cumulative effects on global climate change will be addressed in Section 7.11 of the EIS.*

Comment: There is a carbon footprint of nuclear plants. Approximately, it is estimated that about a million tons of C02 every year is attributed to one nuclear plant. And that is because of the mining process and everything else.

Yes, there is no C02 coming -out of the water coolant towers or anything like that, but there is fossil fuel burning that goes on in relationship to nuclear power generation. And it does have a carbon footprint.
Also, you are probably well aware that nuclear plants take a lot of concrete to build. And it is estimated that in every ton of concrete, there is about a ton of C02 that is released in

manufacturing that concrete. So this all adds up. And it estimated that it accounts, the amount of C02 is about the same as about a fifth to a third of a gas plant. So yes, it is less. But there are other forms—there isn't none. (**0017-64** [Rittenhouse, Ryan])

Comment: nuclear energy is not carbon free. From the cycle, the whole nuclear cycle from uranium mining, ... But the whole process from mining and milling and enrichment, fuel fabrication, and disposal of radioactive waste do add significant greenhouse gas emissions to this planet. (**0017-78** [Stuard, Gary])

Comment: The most prevalent global warming impacts come from increased heat and humidity in the atmosphere. At a nuclear power plant two-thirds of the heat energy gets emitted into the air and heated water vapor is released into the air. Thus nuclear reactors themselves are global warming agents in terms of heat, including water vapor from steam and heat radiating from cooling towers and ponds. The EIS should contain an analysis of the production of heat energy emitted into the atmosphere and water by Comanche Peak Units 3 and 4 in terms of contributions to global warming. (**0022-24** [Hadden, Karen])

Response: *The cumulative effects of heat, water vapor, and greenhouse gas emissions by construction and operation (including the fuel cycle) of the proposed units on global warming will be addressed in Section 7.11 of the EIS.*

D.2.25 Comments Concerning the Need for Power

Comment: The right way to meet our energy needs right now is through energy efficiency, first and foremost, through better building codes. And that's starting to happen throughout the state. Many cities are passing building codes. If we just get smarter about our energy use, we won't need so much. I maintain that these reactors are not necessary. (**0016-13** [Hadden, Karen])

Comment: one thing that I hope you'll do in your assessment of their assessment is to look carefully at their section dealing with the need for energy and the need for this type of power.

One thing I would say is, because of when their assessment was written, it was based upon numbers which we already think aren't legitimate. Those numbers are based on ERCOT projections of 2007. Already the ERCOT projections about power needs in Texas of May of 2008 have a much different view on the need for additional power in the coming years. And that's simply in part because of changes in the growth of our economy, but also in part because Texas has fairly aggressively begun to implement energy-efficiency programs.

And so our—we don't believe this plant is needed to meet our energy needs, and we think there are documents out there that would support that view, including ERCOT's own projections.

And I would also point out that we have a new Speaker of the House, someone who is very much in favor of energy efficiency. He passed legislation last session. Part of that legislation was to commission a report to look at the potential for greater gains in energy efficiency so we can meet more of our needs through energy-efficiency programs. So I would urge you to both look at the Itron report—and I can—in my written comments, I can get you a reference to that, but also—I don't know what your time line is, but also look at the actions during this legislative session. We expect, with the new Speaker of the House and with substantial interest in both the House and the Senate on both energy efficiency and promoting other sources of energy, like solar, geothermal, biomass, there will be significant legislative action that will add to our power mix in Texas, not in terms of nuclear, but in terms of both energy efficiency and other renewables.

So I want you to look at that projection, look at some of the studies that have been done by Itron, by ACEEE and others for Texas, to see if their assessment is realistic in terms of what's needed in Texas and whether we can't meet this demand through other means, including means that, frankly, Luminant is looking at, like wind, and I know they're looking at the potential for utility-scale solar. So I'd urge you to look at that. (**0016-50** [Reed, Cyrus])

Comment: Luminant has not proven there is a need for this new energy.

- The application ignores the effect energy efficiency and renewable energy will have in the future. Are recent state-mandated energy efficiency and renewable energy goals be factored into the energy needs assessment?
- Studies have shown that Dallas/Ft. Worth could meet 101% of projected growth in demand using efficiency and renewable energy.
- State energy use projections should be revisited in light of the economic downturn.

(**0019-21** [Hadden, Karen])

Response: *The EIS Chapter 8 analysis of need for power will reflect ongoing efforts to promote energy efficiency, conservation mandates, and updated demand forecasts by ERCOT.*

Comment: Moreover, the report [ER] largely discounts the role energy efficiency can play. Nonetheless, Luminant will be operating and selling power within ERCOT, where considerable advances in energy efficiency programs have resulted. First, the Texas Legislature through SB 7 in 1999 required the large transmission companies to meet 10 percent of their growth in demand through energy efficiency programs, a requirement that was doubled in 2007 with the passage of HB 3693. The program at the nine investor-owned utilities has been successful. Full reports of the program are available at

http://www.texasefficiency.com/report.html

The following table is from the 2007 report from Fronteir Associates and demonstrates the success of the program in reducing peak demand and saving energy for a fraction of the cost of the nuclear plant.

HB 3693 also required the Public Utility Commission to look at the potential for utilities meeting 50 percent of the growth in demand through energy efficiency programs, and the resulting study concluded that Texas statewide could reduce its peak energy demand by 23 percent by 2018, and that the 50 percent goal by 2015 was economically and technically achievable. The full report - by ITRON - is available through the Public Utility Commission website. http://www.puc.state.tx.us/rules/rulemake/33487/33487.cfm. This legislative session, bills have already been introduced that would accomplish that or similar goals (HB 280, SB 601). (**0032-16** [Reed, Cyrus])

Response: *Chapter 8 of the EIS will reflect legislative mandates for energy conservation that apply to regulated portions of the electric power delivery system in Texas and updates to ERCOT forecasts that reflect the initial impacts of these mandates.*

Comment: We don't need the energy. (**0017-11** [Burnam, Lon])

Comment: We all know that we need to produce more energy. (**0017-15** [Burnam, Lon])

Comment: Energy efficiency can reduce electric demand, and help address global warming today, while building the local economy. (**0030-8** [Hadden, Karen])

Table 3. Utility Funds Expended with Associated Demand and Energy Savings 2007* (From the Annual Energy Efficiency Reports, including SB7 and non-SB7 programs.)

Utility	Funds Expended ($)	Demand Savings (MW)	Energy Savings (MWh)
AEP-SWEPCO	1,234,200	1.61	5,496
AEP-TCC	5,203,100	9.50	25,491
AEP-TNC	993,800	1.37	4,894
CNP	19,563,098	52.28	135,364
EGSI	2,968,000	5.34	15,034
EPE	1,115,000	1.21	5,000
TNMP	819,757	2.30	3,394
Oncor	46,384,709	89.23	216,371
Xcel	2,008,000	4.14	16,818
TOTAL	80,289,664	166.98	427,862

* All energy savings are calculated at meter.

Response: *Chapter 8 of the EIS will describe the results of the NRC staff independent review the need for power and will present an analysis of economic conditions and other factors that influence the need for power.*

Comment: Based on the assumption that a federal repository will not be available for spent fuel management, the EIS should consider the environmental and public health consequences of either the State of Texas or the United States government becoming the de facto custodians of spent fuel at the Comanche Peak site after the operating license has lapsed and post-closure activities of the licensee have been completed. If, at the end of the post-closure responsibilities of the licensee, spent fuel remains on-site it will have to be managed and secured for the indefinite future. The only institutional capacity for long-term spent fuel management is a unit or units of government. To the extent that units of government are responsible for managing on-site spent fuel, calculations for employee exposures and public exposures should be included in the EIS. Additionally, other public health environmental consequences reasonably associated with indefinite governmental management of spent fuel on site should also be considered in the EIS.

The EIS should also consider specifically what entity would actually have legal ownership of the spent fuel after the operating license has lapsed and post-closure activities have ceased. Will the ownership of the spent fuel default to some unit of government? If so, what costs can be reasonably anticipated by the de facto custodian/owner of spent fuel? Do the anticipated costs

have environmental and public health consequences? The EIS should resolve these questions. (**0022-42** [Hadden, Karen])

Response: *Impacts related to the uranium fuel cycle and its transportation steps, including disposal of low-level radioactive waste and spent fuel, will be addressed in Chapter 6 of the EIS. The generic impacts of the fuel cycle are codified in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data." Per the guidance in 10 CFR 51.51 and Section 5.7 of NUREG-1555, the staff will rely on Table S-3 as a basis for uranium fuel cycle impacts. The safety and environmental effects of long-term storage of spent fuel on site have been evaluated by the NRC and set forth in the Waste Confidence Rule at 10 CFR 51.23 (http://www.nrc.gov/reading-rm/doc-collections/cfr/part051/part051-0023.html).*

D.2.26 Comments Concerning Alternatives - No-Action

Comment: There are lots of impacts, environmental and otherwise of all alternatives, too, including the oft-overlooked alternative of doing little or nothing about the situation which the project is being considered. (**0017-58** [Wohler, Will])

Response: *The no-action alternative will be evaluated and addressed in Chapter 9 of the EIS in comparison with the proposed action.*

D.2.27 Comments Concerning Alternatives - Energy

Comment: I would suggest that we very seriously consider geothermal energy. (**0016-61** [Wildwood, Kathleen])

Comment: There are so many sustainable products that need to be looked into, such as was mentioned, geothermal, solar, wind, even gas. But that has disadvantages too, but I would like to ask that you look at those questions. (**0016-76** [Shaar, Julie])

Comment: I think there are cleaner, safer and more economical ways to generate electricity, which is what everybody wants. (**0017-34** [Cohn, Ann])

Comment: TXU could produce electricity safer, cleaner, and cheaper, it is my opinion, if they went solar or wind. (**0017-37** [Cohn, Ann])

Comment: There are alternatives; wind, solar. We can do better. Why can't we be visionary about energy? (**0017-47** [Bisbee, Kay])

Comment: They surely knew, saw the handwriting on the wall for the future, existing and future potential for renewable energy. Yet they went ahead and bought at least Luminant, knowing that they had designs to build these new nuclear power plants. All these facts were available. (**0017-53** [Duncan, Jim])

Comment: Alternative renewable energy sources have their own serious environmental impacts. (**0017-59** [Wohler, Will])

Comment: The energy of the future lies in wind and solar, energy efficiency and other forms of renewable power. (**0017-61** [Rittenhouse, Ryan])

Comment: Additionally, processing uranium into fuel requires substantial amounts of electrical energy and water. The impacts from the use of the substantial amounts of energy and water must be part of a proper EIS. Without this analysis of the use of energy and water in the production of uranium fuel there cannot be a meaningful comparison with practicable

alternatives that do not utilize large amounts of water and electricity for fuel production. (**0022-5** [Hadden, Karen])

Comment: The Comanche Peak environmental report also fails to carefully compare the greenhouse gas effects expected from each of the alternative technologies. This analysis is crucial because of the relationship between greenhouse gases and global warming and because it is expected that the use of fossil fuels to support the uranium fuel cycle will become more expensive over time. This circumstance will be aggravated by the anticipated use of foreign produced uranium that will have a greater greenhouse gas impact because of, among other reasons, a longer supply line. In contrast, renewable fuel technologies are expanding manufacturing capacities domestically. Hence, the EIS should project anticipated greenhouse gas emissions related to the competing technologies. (**0022-51** [Hadden, Karen])

Comment: Alternatives that assess local power generation should be evaluated. For example, several small, local power plants may equal the amount of electricity generated by the proposed Comanche Peak Nuclear Power Plant (CPNPP) project. Local power generation, in contrast to large regional power generation, may have benefits that have not been explored (e.g., local transmission and use of power instead of long distance transmission, ability to deliver electricity in the event of a catastrophic event, smaller potential impacts to water use, waste generation, etc.) (**0027-3** [Osowski Morgan, Sharon L.])

Comment: Safer, cleaner, more affordable ways are now available to generate electricity, including wind, solar and geothermal energy. (**0030-7** [Hadden, Karen])

Response: *Alternative energy sources, including fossil fuels and renewable energy sources such as wind, solar, and geothermal, will be evaluated and addressed in Chapter 9 of the EIS in comparison with the proposed action.*

Comment: If we get energy storage to combine the wind and the solar power, we can have a good base load impact. Our real needs are for peak energy to begin with, and we get that with West Texas Wind. (**0016-15** [Hadden, Karen])

Comment: The Comanche Peak environmental report generally understates the efficacy of alternative sources of electric power generation. p. 9.2-1, et seq. The EIS should evaluate alternative sources of generating capacity based on the current data available regarding capacity factors, technological advances that overcome intermittency challenges regarding wind and solar power, and historical operational experience. It should be noted that Texas leads the nation in wind generation. In 2005, Texas set a goal of 5880 MW of wind by 2015, but the state has already exceeded this amount, and nearly $5 billion additional transmission lines have already been approved. The costs of various forms of energy generation should be considered as well, especially considering that the Federal Energy Regulatory Commission (FERC) published the following data in 2008, showing nuclear power to be the most expensive way to generate electricity.

The Comanche Peak environmental report assumes that renewable fuels such as wind and solar cannot provide adequate baseload generating capacity. However, recent advances in technology such as compressed air energy storage and improved battery storage capacity call into question some of the environmental report's assumptions concerning problems with intermittency. Additionally, current technology advances are proving the assumptions about renewable fuels made in the environmental report to be outdated and inaccurate. Expansions of renewable energy capacity are occurring daily. In contrast, nuclear capacity, as a percentage of total generating capacity, is shrinking. The EIS should evaluate the competing technologies in

light of current energy policy which places a greater emphasis on renewable fuels than did previous energy policy that favored nuclear power and fossil fuels. (**0022-48** [Hadden, Karen])

Comment: The Comanche Peak environmental report understates the ability of Texas to meet its energy demands through energy efficiency and renewable energy. While acknowledging that these technologies will play an increasing role, the report submitted by Luminant assumes that Texas needs large base-load plants to meet future energy demand and that solar, wind, and geothermal technologies are incapable of meeting these needs. Nevertheless, recent reports and advances in technology show that Texas can meet its energy demand through a combination of these technologies. (**0032-14** [Reed, Cyrus])

Comment: First of all, the Texas legislature only recently, in 1999, adopted a Renewable Portfolio Standard, requiring certain utilities to obtain part of their energy mix with renewable power. By 2005, the Legislature chose to raise the requirements to 5,880 MWs by 2015 and a target of 10,000 MWs by 2025. However, Texas has already surpassed the 2105 target and recently approved a $5 billion transmission plan, awarded to some 10 companies, that will lead to approximately 18,000 MWs of largely wind development between existing and planned development. This should occur before 2015. (**0032-15** [Reed, Cyrus])

Comment: Furthermore, recent developments prove that costs for solar power, energy storage and geothermal energy have declined and will continue to decline in the future, especially given federal action to stimulate these new sources of energy. Luminant itself is engaged in a joint investment with Shell to developed air compressed storage from a wind farm in West Texas that could lead to 1,000 MWs of stored energy, in addition to the wind power itself.

The recent Federal Stimulus package as well as action by the Texas legislature could make these energy sources even more attractive, and the planned expansion of the nuclear plant should be judged against these energy sources. We would suggest that the EIS incorporate any recent changes in state and federal law which would make the development of these alternatives more likely. We would suggest that the life-cycle costs, environmental and public health impacts of nuclear be compared to solar, wind, geothermal, coal, natural gas, and energy efficiency and conservation as part of the EIS. (**0032-17** [Reed, Cyrus])

Response: *Alternative energy sources, including combinations of sources such as fossil fuels and renewable energy sources, will be evaluated and addressed in Chapter 9 of the EIS in comparison with the proposed action. Due to the extensive wind resources in the ERCOT service area and the actions already taken or planned to expand wind energy, Chapter 9 of the EIS will provide a detailed analysis of environmental impacts of wind energy as alternative to the proposed action.*

Comment: An expanding number of studies show that nuclear energy is neither clean nor cost-effective in relation to other energy alternatives such as wind and solar energy. The cost of the possible new reactor- up to $22 billion- could retrofit over 7 million Texas homes to make them more energy efficient. (**0010-2** [Shroyer, Danielle])

Comment: There are cleaner ways that make a stronger local economy. The PUC, the Public Utility Commission of Texas, Commissioner Barry Smitherman, recently testified that for every dollar put into energy efficiency, we get two dollars' worth of savings back. (**0016-20** [Hadden, Karen])

Comment: The technique of analysis used in the Comanche Peak environmental report to determine the relative advantages of renewable fuels compared to nuclear power is inherently flawed. For example, the environmental report essentially eliminates conservation/energy efficiency as an alternative that should be considered. p. 9.2-3. The environmental report

excuses the consideration of conservation/energy efficiency, because Comanche Peak Units 3 and 4 will be merchant power plants. And as such, conservation and demand side management programs to encourage consumers to modify levels of electricity usage "are not within the capability or responsibility of the wholesale baseload merchant generator." *Id*. However, the Comanche Peak reactors would operate within the ERCOT system in Texas, so the market is not unlimited. They are bound to buy or sell electricity to within ERCOT, which is wholly within the state. The environmental report attempts to rationalize omission of conservation/energy efficiency measures by citing to NRC policy that has determined that conservation measures are not reasonable alternatives to merchant power plants that sell wholesale power. *Id.* However, the EIS should not be controlled by the same artificial constraint. The Comanche Peak nuclear power plant expansion proposal should be viewed in the larger context of other means by which to influence electricity usage. Adopting the environmental report's conclusions essentially allows merchant power plants to ignore the proven effectiveness of conservation and energy efficiency programs that have been tested numerous time by various utilities as a means to curtail demand.

Texas is in the process of taking further steps to pursue energy efficiency. A new report commissioned by the Texas Public Utilities Commission shows that the state could reduce electric usage by 23% if utilities invest more in efficiency measures, saving Texans as much $11.9 billion on their electric bills. The findings bolster the call by a coalition of local elected officials, business leaders, community groups and faith leaders for the Legislature to increase the mandate on utilities for energy efficiency investments. The Texas legislature passed an energy efficiency bill last session (2007) and is expected to strengthen energy efficiency commitments in 2009, as well as enacting improved buildings codes which will significantly reduce energy demand. The federal stimulus bill includes initiatives and incentives which will further these efficiency efforts and reduce the growth in demand for electricity. (**0022-49** [Hadden, Karen])

Comment: Two additional nuclear reactors are currently proposed by Luminant for the Comanche Peak site southwest of Dallas/Fort Worth near Glen Rose, Texas, where two reactors exist now. The proposed reactors could cost up to $22 billion. This sum used differently could instead retrofit over seven million homes to make them more energy efficient, saving money for consumers, creating local jobs, reducing pollution and addressing global warming directly right now. (**0030-2** [Hadden, Karen])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. While energy efficiency measures could reduce energy demands in the Comanche Peak service area, in accordance with NUREG-1555, a merchant power plant is not required to perform a demand side management analysis or consider measure to increase energy efficiency as an alternative to the proposed action.*

Comment: Be sure to keep the broad picture in view...

Why would we consider the environmental impact of any proposed project separately from considering the impacts of whatever the alternative(s) to that project are?? For that matter, how could we consider only the environmental impacts of the project?? There are lots of impacts, environmental and otherwise, of all the alternatives, too -including the oft-ignored alternative of doing little or nothing about the situation for which the project is being considered!!

Surely, if we don't take a broad view of the situation, we run the risk of skewed policy decisions, no? (& the narrower our focus, the greater the skewing risk!)

Alternative / Renewable energy sources have their own serious environmental Impacts! (not to mention their much lower energy 'density' & continuity of availability). For example, the infrastructure needed to harness these other power sources consumes tremendous resources (in materials, land & monetarily). And unless a great deal more resources are used for the capacity storage that all these sporadically-available power sources require, we'll still have to use conventional, always-available power sources to 'fill in' for when the Alternative / Renewable sources aren't available. (Wind & Solar are highly variable in availability!)

Excessive Conservation also has adverse environmental impacts -from the more impoverished conditions resulting from too much reliance on Conservation. A more prosperous society is more able to afford the costs of higher levels of environmental preservation!

Just as "No one is an Island" (unto themselves), we dare not consider, in isolation, the impacts of just one (kind of) proposal.

Something else to keep in mind as deliberation proceeds on these proposed new nuclear power generating facilities:

The validity of scientific (and other) theories & findings, is not in any way dependent on how many -or few -people express those theories & findings. Likewise, the wisdom of any particular public policy(ies) also has no necessary relationship to the number of people supporting them. None of those things bears any necessary relationship to majority (or minority) views. (**0018-3** [Wohler, Will])

Comment: The right way to meet our energy needs right now is through energy efficiency, first and foremost, through better building codes. And that's starting to happen throughout the state. Many cities are passing building codes. If we just get smarter about our energy use, we won't need so much. I maintain that these reactors are not necessary. (**0016-13** [Hadden, Karen])

Comment: Wind and solar energy are well developed now and more affordable than nuclear power. Energy efficiency helps curb demand. We do not need nuclear power or the risks that it entails. (**0019-7** [Hadden, Karen])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. While energy efficiency measures could reduce energy demands in the Comanche Peak service area, in accordance with NUREG-1555, a merchant power plant is not required to perform a demand side management analysis or to consider measures to increase energy efficiency as an alternative to the proposed action. Chapter 9 of the EIS will describe potential impacts from alternative energy sources. Due to the extensive wind resources in the ERCOT service area and the actions already taken or planned to expand wind energy, Chapter 9 of the EIS will provide a detailed analysis of environmental impacts of wind energy as alternative to the proposed action.*

Comment: With the wind turbine, there may be an accident now and then, but you don't have thousands of people at risk from a radioactive waste release with a wind turbine. (**0016-19** [Hadden, Karen])

Comment: The Comanche Peak environmental report is also flawed to the extent that it fails to make a realistic comparison between the environmental impacts and public health consequences of nuclear power compared to energy efficiency and renewable fuels. For example, there should be a side-by-side comparison of mortality and morbidity consequences of nuclear power compared to energy efficiency and renewable fuels in order to accurately determine the consequences of each. Of course, the comparisons would indicate that energy efficiency and renewable fuels do not cause increased mortality and morbidity while nuclear fuel

does. Moreover, there should be a side-by-side comparison of nuclear fuels and energy efficiency and renewable fuels, related to the effects of catastrophic accidents. Such a side-by-side comparison would indicate that a catastrophic loss of, for example, a wind generating accident or capacity loss would be negligible compared to a major loss of cooling accident at Comanche Peak Units 3 and 4. The EIS should engage such a comparative analysis in order to fairly determine the environmental consequences and public health impacts of each. (**0022-50** [Hadden, Karen])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. The EIS will evaluate the risk and consequences of design basis and severe accidents in Chapter 5. The discussion of alternative energy sources, including wind and solar, will be addressed in Chapter 9 of the EIS, which will compare and describe potential environmental impacts from alternative energy sources. Alternative energy sources will be evaluated first to determine if the energy source can meet the purpose and need of the project. If they cannot meet the purpose and need then they are not evaluated further. As part of the COL process and in conjunction with the EIS, the NRC staff will conduct a safety review detailing site-specific safety analysis and design specific analysis, including NRC acceptance.*

Comment: It's [nuclear power is] not a useful solution to climate change. You can't build reactors fast enough to meet any significant portion of the energy needs to be produced. (**0016-12** [Hadden, Karen])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. Alternative energy sources, including fossil and renewable energy sources such as wind, solar, and geothermal, will be evaluated and addressed in Chapter 9 of the EIS in comparison with the proposed action.*

Comment: Do I have to waste the energy I'm wasting today? In the little things that we do, inefficient lighting, the extras that we do through every day, the things that we leave on that we could turn off, do we have to do that so badly that we're willing to leave a legacy of radioactive waste that literally will last millions of years, that someone someday is going to have to repackage and make sure it's contained safely so it doesn't escape into the environment. (**0016-17** [Hadden, Karen])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. While energy efficiency measures could reduce energy demands in the Comanche Peak service area, in accordance with NUREG-1555, a merchant power plant is not required to perform a demand side management analysis or consider measure to increase energy efficiency as an alternative to the proposed action. Section 9 of the EIS will describe potential impacts from alternative energy sources. The impact of the uranium fuel cycle, including disposal of low-level radioactive waste and spent fuel, will be addressed in Chapter 6 of the EIS.*

Comment: there will be significant legislative action that will add to our power mix in Texas, not in terms of nuclear, but in terms of both energy efficiency and other renewables.

And I left in the back sort of some of the legislative goals that Lone Star Chapter of the Sierra Club has, many of—all of which, frankly, are also for economic benefit. It's about promoting other kinds of energy use and energy efficiency that are also good for the economy. And our view is that if you look at all the different energy sources, nuclear really should be the last option we look at.

So I want you to look at that projection, look at some of the studies that have been done by Itron, by ACEEE and others for Texas, to see if their assessment is realistic in terms of what's needed in Texas and whether we can't meet this demand through other means, including means that, frankly, Luminant is looking at, like wind, and I know they're looking at the potential for utility-scale solar. So I'd urge you to look at that. (**0016-51** [Reed, Cyrus])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. The discussion of alternative energy sources, including wind and solar, will be addressed in Chapter 9 of the EIS, which will compare and describe potential environmental impacts from alternative energy sources. Due to the extensive wind resources in the ERCOT service area and the actions already taken or planned to expand wind energy, Chapter 9 of the EIS will provide a detailed analysis of environmental impacts of wind energy as alternative to the proposed action.*

Comment: The right way to meet our energy needs right now is through energy efficiency, first and foremost, through better building codes. And that's starting to happen throughout the state. Many cities are passing building codes. If we just get smarter about our energy use, we won't need so much. I maintain that these reactors are not necessary. (**0016-14** [Hadden, Karen])

Comment: And we all know that we need to do conservation. (**0017-16** [Burnam, Lon])

Comment: An easier way to increase, or to use energy more efficiently is a better way of conserving energy, and Texas leads in being energy wasteful. Energy conservation and energy efficiency are easy ways to go. (**0017-79** [Stuard, Gary])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. While energy efficiency measures could reduce energy demands in the Comanche Peak service area, in accordance with NUREG-1555, a merchant power plant is not required to perform a demand side management analysis or consider measure to increase energy efficiency as an alternative to the proposed action.*

Comment: say, cut this off right now, and go for alternative sources of energy, truly green jobs. If you want a jobs program, get one that is not going to hurt the next generation. (**0017-73** [Sanders, Jan])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. Chapter 9 of the EIS will describe potential impacts from alternative energy sources.*

D.2.28 Comments Concerning Alternatives - System Design

Comment: The study should also include an analysis of pollution impacts downstream from water contaminated by chemical treatment such as biocides, algaecides, pH adjustors, corrosion inhibitor and silt dispersant chemicals injected at the reactor site as well as chlorine, salts and non-radioactive effluent. The differential impact of treatment of 100 percent of the water versus the lesser amount of treatment proposed by the applicant should be considered. (**0022-19** [Hadden, Karen])

Comment: The proposed project will withdraw water for cooling tower makeup from Lake Granbury and return the cooling tower blowdown back to Lake Granbury. Currently, Lake Granbury is listed as being impaired for chlorides. CPNPP should know that a total maximum daily load (TMDL) will be prepared for Lake Granbury to address the chloride impairment. The TMDL will give a wasteload allocation for chlorides to CPNPP for its cooling tower blowdown

discharge. CPNPP should be aware that it may be required to meet the water quality standard for chlorides or significantly reduce the level of chloride in its discharge. Texas Commission on Environmental Quality (TCEQ) is responsible for developing TMDLs and TMDL Implementation plans. EPA reviews and approves TMDLs developed by TCEQ. (**0027-11** [Osowski Morgan, Sharon L.])

Comment: Best Management Practices (BMPs) should be used to reduce erosion during construction. Typical BMPs include the use of staked hay bales, silt fences, mulching and reseeding, and appropriate buffer zones along water bodies. The document should include an erosion control plan or reference the State erosion control regulations and a commitment to compliance. Compliance should include both BMP application and maintenance. (**0027-8** [Osowski Morgan, Sharon L.])

Response: *The construction and operation of a nuclear plant involves some discharges to nearby water bodies. The Clean Water Act designated the U.S. Environmental Protection Agency as the Federal agency with responsibility over effluent discharges to the nation's waters. While it only regulates radiological effluents, the NRC does have the responsibility under NEPA to assess and disclose the expected impacts of the proposed action on water quality throughout the plant's life. The staff's assessment of the nonradiological impacts to water quality will be presented in Chapter 5 of the EIS. Luminant's proposed blowdown waste water treatment would return water to Lake Granbury in compliance with all regulatory water quality requirements. Consequently, additional levels of water treatment would not be necessary. Alternatives for additional water treatment, including those suggested in the comment, will not be addressed in the EIS.*

Comment: The Energy Policy Act of 2005 directed the United States Department of Energy to research and develop proliferation resistant fuel recycling and transmutation technologies that are intended to minimize damage to the environment and public health and to enhance safety of spent fuel management. The EIS should consider this alternative and determine whether it is technologically feasible and prudent to pursue. The reason for this alternative to be considered as a spent fuel management technique is because it assumes that a federal repository for spent fuel will not be available. Proliferation resistant fuel recycling and transmutation technologies may have the effect of managing spent fuel in a way that minimizes adverse impacts to the public's health and the environment. Therefore, the EIS should fully develop the state of these technologies and determine whether such would be available for purposes of managing spent fuel at Comanche Peak. (**0022-41** [Hadden, Karen])

Response: *Chapter 6 of the EIS evaluates the fuel cycle impacts including both a no-recycle process and a recycle process. The safety and environmental effects of spent fuel storage onsite have been evaluated by the NRC and, as set forth in the Waste Confidence Rule (10 CF 51.23), the NRC generically determined that such storage could be accomplished without significant environmental impacts. In the Waste Confidence Rule, the Commission determined that spent fuel can be safely stored onsite for at least 30 years beyond the plant's life.*

Comment: When the first two reactors were built the sky glow light pollution went from zero to off the scale in the direction of the reactors. The latest round of fixture modernization reduced the sky glow by about 40 percent. Our Concern is the two new units will increase the sky glow beyond what it was after initial construction. We would like to see a comprehensive relighting program for all four reactors, using the latest technology zero cut-off fixtures, such as those approved by the International Dark-sky Association in order to achieve an overall reduced light pollution impact than what now exists. www.darksky.org (**0024-1** [Miller, Russ])

Response: *The physical impacts of the facility operation at the proposed site, including the impacts of the proposed plant lighting, will be evaluated in Chapter 5 of the EIS.*

Comment: In my conversations with engineers, it is commonly believed that a better engineered cooling system could easily reduce or eliminate this water loss. [Loss of 55,000 acre feet per year to evaporative cooling.] FBR [Friends of the Brazos River] respectfully asks that you delay this permit until a less wasteful cooling system can be designed. (**0025-2** [Lowe, Ed])

Response: *The construction and operation of a nuclear plant involves the consumption of water. The staff will independently assess the impact of these consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population, and changes in water supply resulting from climate variability and climate change. While the NRC does not regulate or manage water resources, it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment of the impacts on water resources from the plant's proposed cooling system will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively. The impacts of alternatives to the proposed cooling system will be evaluated in Chapter 9 of the EIS.*

Comment: The Comanche Peak report admits that there is no federal site for disposition of high-level nuclear waste and that present options for disposal of low-level radioactive waste are limited. Given the difficulty in siting both low-level and high-level radioactive waste, an EIS should consider all of the waste disposal options, including long-term storage at the site itself. (**0032-12** [Reed, Cyrus])

Response: *The impact of the uranium fuel cycle, including disposal of low-level radioactive waste and spent fuel, will be addressed in Section 6 of the EIS. The generic impacts of the fuel cycle are codified in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data." Per the guidance in 10 CFR 51.51 and Section 5.7 of NUREG-1555, the staff will rely on Table S-3 as a basis for uranium fuel-cycle impacts. The Waste Confidence Rule (10 CFR 51.23) has determined that spent fuel can be safely stored on site for at least 30 years beyond the life of the plant.*

Comment: Given the uncertainty involved with licensing the Yucca Mountain Nevada facility for the disposal of spent nuclear fuel, all utilities planning on constructing additional nuclear units on current sites should consider contingencies for long-term storage of waste on-site. (**0027-6** [Osowski Morgan, Sharon L.])

Response: *The safety and environmental effects of spent fuel storage onsite have been evaluated by the NRC and, as set forth in the Waste Confidence Rule (10 CF 51.23), the NRC generically determined that such storage could be accomplished without significant environmental impacts. In the Waste Confidence Rule, the Commission determined that spent fuel can be safely stored onsite for at least 30 years beyond the plant's life.*

D.2.30 Comments Concerning Benefit - Cost Balance

Comment: The two proposed Comanche Peak reactors could cost up to $22 billion according to Luminant's own documents. This is before cost overruns. This amount could make 7.3 million homes more energy efficient. Pursuing efficiency lowers bills, reduces electricity consumed, and creates local jobs. The existing Comanche Peak reactors ran ten times over budget and were years late coming online. What if this happened again? (**0019-8** [Hadden, Karen])

Response: *These points will be noted and discussed in the EIS. NUREG-1555 call for the Benefit-Cost analysis to include consideration of internal and external costs. The scope of the analysis for internal costs are those costs for the design proposed by the applicant (NUREG-1555). Scenario analysis of vast departures from these costs is therefore outside the scope of this analysis.*

Comment: Further, I request to see an analysis of water use per kilowatt hour produced for the proposed new plant reactors and the cost of this power if Luminiant had to pay current wholesale water rates. (**0021-3** [Richardson, Karen])

Response: *The EIS will reflect the cost of cooling systems in its analysis and the water quantities lost through evaporation and other losses in Chapter 10 of the EIS.*

Comment: 3. Reactor Lifespan - (a) What is the average effective life span of a nuclear reactor?

(b) How much additional funding will be required to maintain an aging reactor? (**0023-7** [Ubico, Jean])

Response: *The assumptions of reactor life span and costs used in this analysis will be provided in Section 10 of the EIS. Costs for all phases of reactor construction and maintenance will be discussed, but data are specific to the proposed plants and the alternatives chosen and cannot be applied to a "representative" reactor. The license period for a combined license is 40 years. A licensee can request renewal for an additional 20 years. The cost benefit analysis is done for the license period of 40 years. It would not be appropriate to assume additional cost or benefit for an additional 20 years of license renewal when that action has not been requested or approved.*

Comment: The second piece entitled 'Troubled History of Comanche Peak' is intended to bolster the case for including consideration of existing reactors' history in the EIS. The past is prelude to the future. The EIS must address the possibility that difficulties similar to those which occurred in the past might occur again. The problems that arose in the past were frequently related to using new technologies. As the USAPWR design proposed for Comanche Peak Units 3 and 4 has never been built anywhere in the world, the likelihood of problems and resulting health and environmental impacts is likely to increase. A full analysis of the difficulties of building the reactors successfully including an examination of the history of existing reactors should be undertaken in the EIS. (**0030-1** [Hadden, Karen])

Response: *The EIS will contain a detailed analysis of the proposed reactors and comparisons of alternatives to the proposed reactors. A detailed analysis of the history of the nuclear power industry that goes beyond the proposed reactors and the alternatives is beyond the scope of this EIS.*

Comment: Nuclear technology is not cost effective, requiring massive subsidies from taxpayers. (**0031-8** [Gentling, Suzanne])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates nuclear energy to protect public health and safety within existing policy. An analysis of the proposed facilities and alternatives will be presented in Chapter 9 of the EIS.*

Comment: I have read, from a financial standpoint, how much taxpayers are paying for this nuclear power plant. I have read the bills that have to do with the energy bills for 2005 and so on, that show all the subsidies that are going into the nuclear power plants. So we are paying for it. (**0017-50** [Harper, Debbie])

Response: *Chapters 9 and 10 of the EIS will review the costs of constructing the plant and compare the proposed site with alternatives. Non-monetary costs, such as environmental impacts and other costs, will also be analyzed and summarized in a benefit cost section. The NRC staff is aware that nuclear energy receives some subsidies and that all other energy forms are also subsidized in different ways. A complete analysis that compares all of these subsidies on a common basis is beyond the scope of the EIS.*

Comment: [The proposed Comanche Peak units 3 and 4 are a] Waste of money. (**0017-81** [Sanders, Jan])

Response: *Chapter 10 of the EIS will contain an analysis of the need for the power for the proposed facility, the alternatives to the proposed facility, and a summary of benefits and costs. Ultimately, the plant will be evaluated relative to other ways to meet the forecasted demands for power.*

Comment: Ecosystem services are the benefits humans derive from nature. The concept of ecosystem services encompasses natural renewable resources and processes that are essential to human well being like clean water, clean air, and a host of other services that have not been traditionally incorporated into cost-benefit analyses, but can be considered. The concepts of ecosystem services and sustainability are interconnected. If use of ecosystem services exceeds the environment's capacity to perform those services, then the activity is not sustainable over time. The NEPA document should discuss aspects of ecosystem services and sustainability as appropriate. (**0027-24** [Osowski Morgan, Sharon L.])

Response: *The comment correctly notes that the environment and other natural systems provide services that contribute to societal well-being, but that these services are not marketed and are difficult to measure. For this reason, the EIS process has traditionally sought to add the costs of mitigating external impacts to the costs summarized in Chapter 10 of the EIS. Where possible a quantitative value for mitigated costs will be used and where this is not possible a qualitative analysis will be used. Unmitigated costs are termed unavoidable and are valued and included in the analysis in the same way. The scope of this analysis is described in NUREG-1555 p. 2.4.2 and will be followed in Chapter 10 of the EIS.*

Comment: The cost to the taxpayers. I think all of us should feel quite sore already from the fact that we have been stuck with high bills, given corporate malfeasance and corruption, and that we have been left with paying the bill. The only reason why nuclear power could be on the plate or the playing field is the fact that it is going to be heavily subsidized, i.e.; you and I will pay for it. I don't know about you, but that doesn't leave a good taste in my mouth.
Also a recent study that has just recently come out, called Business Risks and Costs of New Nuclear Power has put the generation cost of power or power from nuclear power plants at from 25 to 30 cents per kilowatt hour. That is triple the current U.S. electricity rate. (**0017-77** [Stuard, Gary])

Response: *The EIS will review the environmental costs of constructing the plant and compare the proposed site with alternatives. Non-monetary costs, such as environmental impacts and other costs, will also be analyzed and summarized in a benefit cost section. The NRC staff is aware that nuclear energy receives some subsidies and that all other energy forms are also subsidized in different ways. A complete analysis that compares all of these subsidies on a common basis is beyond the scope of the EIS. However, it is noteworthy that following the restructuring of the ERCOT electric power system, wholesale power producers must compete with other power suppliers and that their investors have their capital at risk if the facilities cannot successfully compete in the marketplace. Under this system, power generators are not subject to rate of return regulation and have no guaranteed profits.*

Comment: The indirect or secondary impacts should be assessed. In particular, the potential impacts associated with water use from sources other than SCR. The secondary impacts from fuel mining and processing should also be investigated. Currently, there does not seem to be enough information in Section 10.2.1.6 section to evaluate. The ER states impacts from mining on geological resources are expected to be small. This statement is not consistent with the large scale and wide-ranging impacts mining may potentially have on the environment. Additional information should be provided. (**0027-26** [Osowski Morgan, Sharon L.])

Response: *Chapters 4 and 5 of the EIS will review secondary impacts from constructing and operating the plant including impacts from water usage and from the nuclear fuel cycle, including mining, processing, and fuel fabrication. Where staff finds the applicant's analysis unpersuasive or inadequate, staff will request additional information from the applicant. If necessary staff will carry out additional independent analyses. The public will have an opportunity to review the draft EIS and to comment on it.*

Appendix E

Draft Environmental Impact Statement Comments and Responses (Reserved)

Appendix E

Draft Environmental Impact Statement Comments and Responses (Reserved)

Appendix F

Key Consultation Correspondence Regarding the Comanche Peak Nuclear Power Plant, Units 3 and 4, Combined Licenses Application

Appendix F

Key Consultation Correspondence Regarding the Comanche Peak Nuclear Power Plant, Units 3 and 4, Combined Licenses Application

Correspondence sent and received during the evaluation process for the combined license application for the siting of two new nuclear units, Units 3 and 4, at the Comanche Peak Nuclear Power Plant site in Somervell and Hood Counties, Texas is identified in Table 1. In addition, a full copy of the Biological Assessment is included in this appendix.

Table 1. Key Consultation Correspondence

Source	Recipient	Date of Correspondence
U.S. Nuclear Regulatory Commission (William Burton)	Texas State Historic Preservation Officer (Lawerence Oaks)	December 23, 2008 ML083400507
U.S. Nuclear Regulatory Commission (William Burton)	Texas Parks and Wildlife Department (Kathy Boydston)	December 23, 2008 ML083400514
U.S. Nuclear Regulatory Commission (William Burton)	U.S. Advisory Council on Historic Preservation (Don Klima)	December 23, 2008 ML083410002
U.S. Nuclear Regulatory Commission (William Burton)	U.S. Fish and Wildlife Service (Tom Cloud)	December 23, 2008 ML083450242
U.S. Nuclear Regulatory Commission (William Burton)	National Marine Fisheries Service (David Bernhart)	December 23, 2008 ML083450284
U.S. Nuclear Regulatory Commission (William Burton)	Absentee-Shawnee Tribe of Oklahoma (Scott Miller)	December 23, 2008 ML083460276
U.S. Nuclear Regulatory Commission (William Burton)	White Mountain Apache Tribe (Ronnie Lupe)	December 23, 2008 ML083460284

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Table 1. (contd)

Source	Recipient	Date of Correspondence
U.S. Nuclear Regulatory Commission (William Burton)	Alabama-Coushatta Tribe of Texas (Bryant Celestine)	December 23, 2008 ML083460323
U.S. Nuclear Regulatory Commission (William Burton)	Apache Tribe of Oklahoma (Alonzo Chalepah)	December 23, 2008 ML083460347
U.S. Nuclear Regulatory Commission (William Burton)	Caddo Nation of Oklahoma (LaRue Parker)	December 23, 2008 ML083460378
U.S. Nuclear Regulatory Commission (William Burton)	Cheyenne Arapaho tribes of Oklahoma (Darrell Flyingman)	December 23, 2008 ML083460400
U.S. Nuclear Regulatory Commission (William Burton)	Comanche Nation (Wallace Coffey)	December 23, 2008 ML083460416
U.S. Nuclear Regulatory Commission (William Burton)	The Delaware nation, Delaware Tribe of Western Oklahoma (Kerry Holton)	December 23, 2008 ML083460442
U.S. Nuclear Regulatory Commission (William Burton)	Delaware Tribe of Western Oklahoma (Jerry Douglas)	December 23, 2008 ML083460483
U.S. Nuclear Regulatory Commission (William Burton)	Ft. Sill Apache Tribe of Oklahoma (Jeff Houser)	December 23, 2008 ML083460509
U.S. Nuclear Regulatory Commission (William Burton)	Jicarilla Apache Nation (Lorene Willis)	December 23, 2008 ML083460546
U.S. Nuclear Regulatory Commission (William Burton)	Kickapoo Traditional Tribe of Texas (Juan Garza)	December 23, 2008 ML083460577
U.S. Nuclear Regulatory Commission (William Burton)	Kiowa Tribe of Oklahoma (Billy Horse)	December 23, 2008 ML083460598

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Table 1. (contd)

Source	Recipient	Date of Correspondence
U.S. Nuclear Regulatory Commission (William Burton)	Mescalero Apache Tribe (Carleton Naiche-Palmer)	December 23, 2008 ML083460623
U.S. Nuclear Regulatory Commission (William Burton)	Wichita and Affiliated Tribes (Leslie Standing)	December 23, 2008 ML083470301
U.S. Nuclear Regulatory Commission (William Burton)	Osage Nation (Jim Roan Gray)	December 23, 2008 ML083470322
U.S. Nuclear Regulatory Commission (William Burton)	Tonkawa Tribe of Oklahoma (Anthony Street)	December 23, 2008 ML083470373
Tonkawa Tribe of Oklahoma (Donald L. Patterson)	U.S. Nuclear Regulatory Commission (William Burton)	January 5, 2009 ML090500590
National Marine Fisheries Service (David M. Bernhart)	U.S. Nuclear Regulatory Commission (William Burton)	January 8, 2009 ML090230148
U.S. Environmental Protection Agency, Region 6 (Cathy Gilmore)	U.S. Nuclear Regulatory Commission (Michael Lesar)	February 13, 2009 ML090680037
Texas Parks and Wildlife Department (Carter Smith)	U.S. Nuclear Regulatory Commission (Michael Lesar)	February 16, 2009 ML090680387
Advisory Council on Historic Preservation (Charlene Dwin Vaughn)	U.S. Nuclear Regulatory Commission (William Burton)	February 17, 2009 ML090500077
U.S. Fish and Wildlife Services (Sean Patrick Edwards)	U.S. Nuclear Regulatory Commission (Michael Willingham)	February 19, 2009 ML092430749
Texas Parks and Wildlife Department (Karen Hardin)	U.S. Nuclear Regulatory Commission (Michael Lesar)	April 24, 2009 ML091310617

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Table 1. (contd)

Source	Recipient	Date of Correspondence
Texas Historical Commission (Mark Wolfe)	Enercon Services Inc. (Stacy Burgess)	June 10, 2009 ML092090669

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Biological Assessment

U.S. Fish and Wildlife Service

Comanche Peak Nuclear Power Plant
Units 3 and 4

U.S. Nuclear Regulatory Commission Combined License Application
Docket Nos. 52-034 and 52-035

U.S. Army Corps of Engineers Permit Application

August 2010

U.S. Nuclear Regulatory Commission
Rockville, Maryland

U.S. Army Corps of Engineers
Fort Worth District

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from Luminant Generation Company LLC (Luminant) for two combined licenses (COLs) for construction and operation of two new nuclear power plants at its Comanche Peak Nuclear Power Plant (CPNPP) site. The CPNPP site lies approximately 5 mi north of Glen Rose, Texas, and approximately 9 mi south of Granbury, Texas, outside the limits of either city (see Figure 1). The COL application was submitted by Luminant to the NRC on September 19, 2008. Concurrent with the NRC's review, the U.S. Army Corps of Engineers (USACE) is reviewing Luminant's COL application for a Department of the Army (DA) Permit to build the reactors and support structures in waters of the United States on the CPNPP site. The NRC and the USACE are cooperating agencies with the NRC being the lead agency, and this biological assessment (BA) supports a joint consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA) of 1973. The USACE is cooperating with the NRC to ensure the information presented in the EIS is adequate to fulfill the requirements of Corps regulations; the Clean Water Act Section 404(b)(1) Guidelines, which contain the substantive environmental criteria used by the USACE in evaluating discharges of dredged or fill material into waters of the United States; and the USACE public interest review process. Currently there are two operating nuclear reactors on the CPNPP site, Units 1 and 2.

The proposed new reactors, Units 3 and 4, would be located adjacent to the existing units in areas that had experienced previous temporary disturbance during development of Units 1 and 2, along with some adjoining areas of previously undisturbed areas of land. The proposed support structures would also occupy previously developed land as well as grasslands, Ashe juniper (*Juniperus ashei*) woodland - savanna, and mixed hardwood communities. Luminant has identified the need for new and expanded transmission line and pipeline corridors as part of the project (see Figure 2). The routes for a proposed 17-mi transmission line (referred to as the DeCordova line) and a proposed 17-mi cooling water pipeline to Lake Granbury would go through Somervell and Hood Counties, Texas. A proposed 45-mi transmission line (referred to as the Whitney line) would go through Somervell and Bosque Counties. Although approximate corridors for the new lines have been identified, exact rights-of-way for the new lines are yet-to-be determined. For three other transmission line rights-of-way with lengths of 41.6, 22.4, and 22.4 mi, Luminant has stated that no land-use impacts are anticipated, since the new conductors would be added to vacant circuit positions on existing steel towers on rights-of-way where vegetative maintenance is already being performed on those rights-of-way (Luminant 2009a).

The NRC is required to prepare an environmental impact statement (EIS) as part of the agency's review of the COL and DA permit applications. As required by Title 10 of the Code of Federal Regulations(CFR) Part 51.26, the NRC has published in the *Federal Register* a Notice of Intent (73 FR 77076) to prepare an EIS and to conduct scoping. The final EIS would be issued after considering public comments on the draft EIS.The impact analysis in the EIS includes an assessment of the potential environmental impacts of the construction and operation of the two new nuclear power units at the CPNPP site and along the associated transmission and pipeline corridors, including potential impacts to threatened and endangered species. If approved, the COL and DA permit would authorize Luminant to construct and operate the new units.

This BA examines the potential impacts on federally listed threatened or endangered terrestrial species of construction and operation of the proposed Units 3 and 4 at the CPNPP site and along the proposed new transmission and pipeline rights-of-way, pursuant to Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended.

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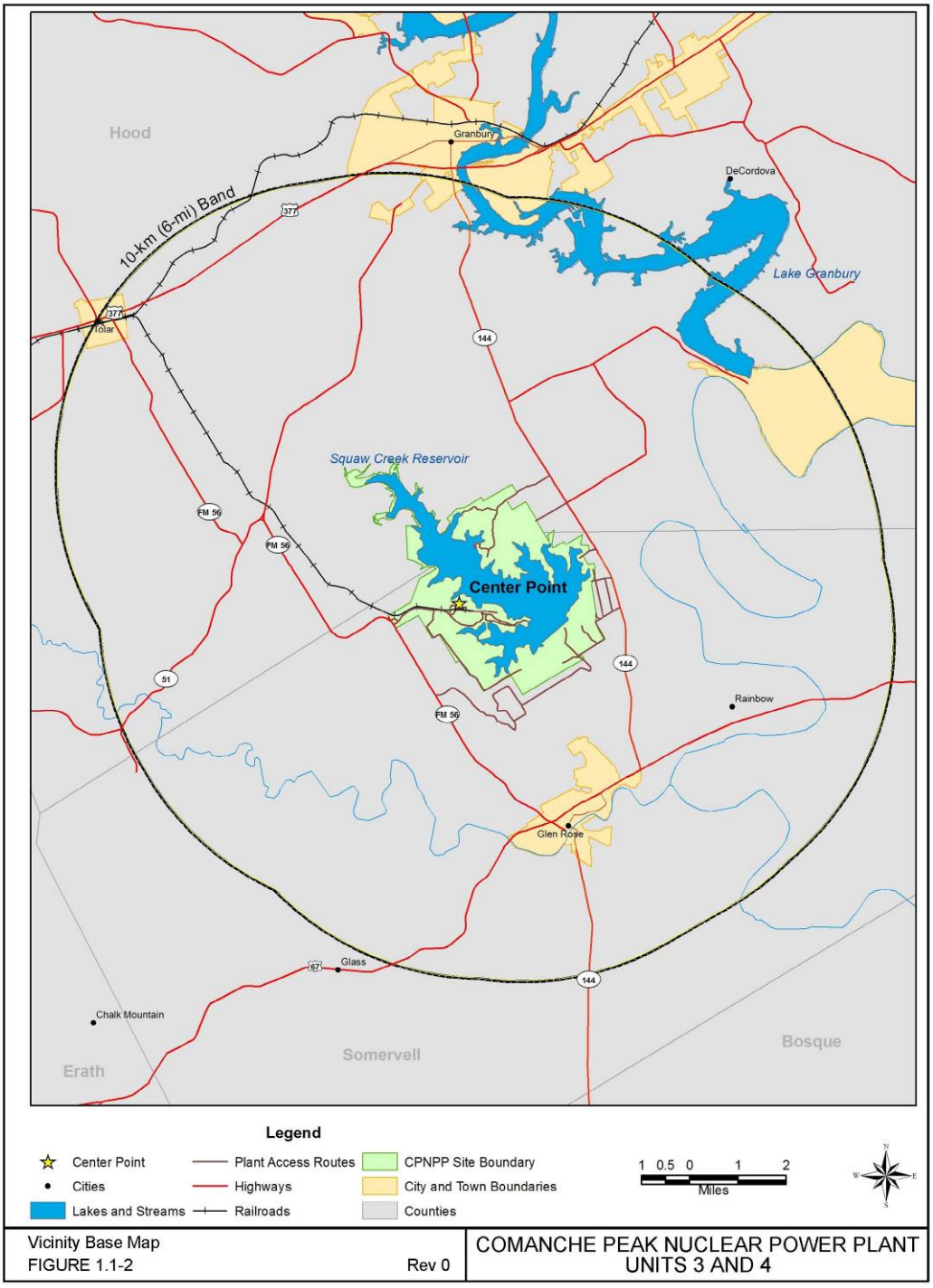

Figure 1. Location of the CPNPP site within Hood and Somervell Counties, Texas (Luminant 2009a).

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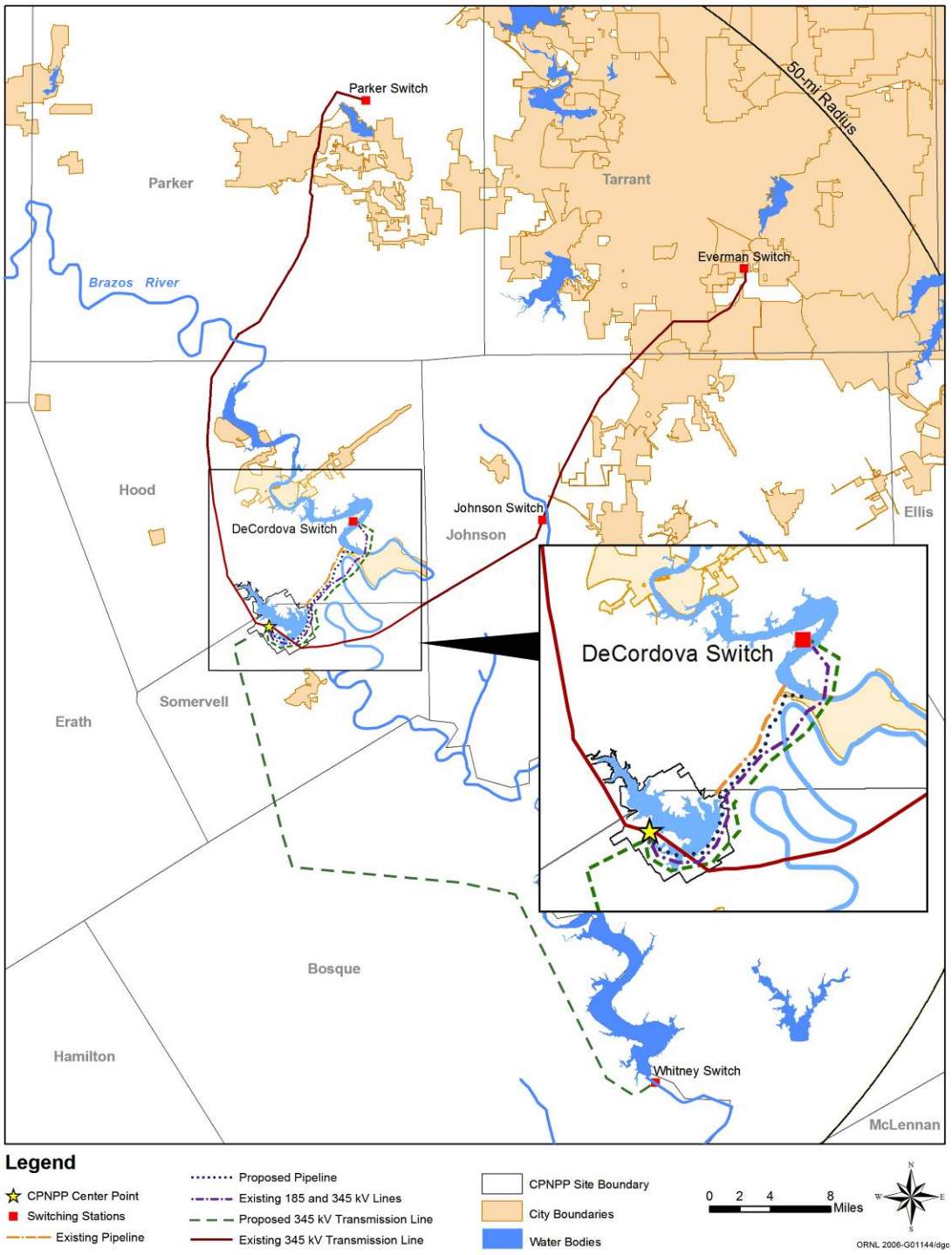

Figure 2. Existing and proposed transmission line rights-of-way and pipeline routes. Note: All routes are approximate, and the exact alignments of the routes have yet to be determined. The existing 345-kV transmission line rights-of-way can support a second circuit on the existing support towers. The existing 185 and 345-kV transmission lines will not be modified (adapted from Luminant 2009a).

2.0 CPNPP Project Site Description

The CPNPP site lies within the Western Cross Timbers subdivision of the Grand Prairie physiographic province (Wermund 1996). The province is transitional between the vast prairies to the west and the forested hills or low mountains to the east. Ecologically, the site lies within the Western Cross Timbers subdivision of the Grand Prairie ecoregion, which is characterized by a mosaic of forest, woodland, savanna, and prairie with dominant vegetation that includes little bluestem (*Schizachyrium scoparium*) with scattered stands of blackjack oak (*Quercus marilandica*) and post oak (*Q. stellata*) (Griffith et al. 2004). Historical records indicate that much of the region existed as a grassland or open live oak savanna that supported herds of bison and other herbivores dependent on the tall grasses that dominated the region (TPWD 2007). The introduction of domestic livestock, farming operations, and wildfire control changed the landscape of much of the region. These practices created a landscape that experienced invasion and localized domination in some areas by problematic scrub species such as mesquite (*Prosopis* spp.), Ashe juniper, and other native woody species. Overgrazing by livestock and elimination of naturally occurring fire also reduced native grass cover and allowed the invasion of other, less desirable annual grasses and forbs.

Luminant prepared an ecological vegetation cover type map of the CPNPP site based on interpretation of aerial photographs showing the current spatial distribution of vegetation types and aquatic habitats present (Figure 3). The two general regional vegetation cover types (oak-mesquite-juniper savanna and woodlands, and silver bluestem [*Bothriochloa saccharoides*]–Texas wintergrass [*Nassela* (=*Stipa) leucotricha*]) were further classified into more site-specific descriptions using 1999 infrared aerial photography and ground-truthing in 2006 and 2007 (Luminant 2009a). Figure 3 shows that terrestrial cover of the site is predominantly Ashe juniper woodland – savanna and grasslands. A description of each cover type follows:

Ashe Juniper Woodland - Savanna. Strands of Ashe juniper woodland – savanna are evergreen, dominated by mature Ashe juniper trees or a combination of mature and immature Ashe juniper trees and saplings. Mature Ashe juniper trees are over 15 ft high with 5 in or more in diameter at breast height (DBH), approximately 4.5 ft above the ground. Hardwood species occupy 10 percent or less of the canopy. This cover type is the most common terrestrial habitat type at CPNPP and occupies a total of about 3071 ac or approximately 39 percent of the site. Ashe juniper woodland - savanna covers about 60 percent of the peninsula where new cooling towers for Units 3 and 4 would be located. This peninsula is located just to the northwest of, and adjacent to, the peninsula on which existing Units 1 and 2 are located (Figure 4). Substanital land clearing would be needed on the peninsula to accommodate the cooling towers. Similarly, the proposed blowdown treatment facility (BDTF), which is located to the southeast (see Figure 5), would be developed in what is now predominantly Ashe juniper habitat. This facility is only in design concept phase, but the roughly 400-ac location it would occupy, including its associated evaporation ponds, is depicted in Figure 5.

Mixed Hardwood Forest. Mixed hardwood forests are dominated by a combination of hardwood tree species including live oak (*Quercus virginiana*), cedar elms (*Ulmus crassifolia*), mesquite, hackberry (*Celtis* spp.), Texas ash (*Fraxinus texensis*), chittamwood (*Sideroxlyon lanuginosa*), and occasional persimmon (*Diospyros texana*) trees. Ashe junipers comprise 30 percent or less of the tree canopy in mixed hardwood stands. The shrub layer includes buckbrush (*Ceanothus cuneatus*), agarito (*Berberis trifoliata*), lemon sumac (*Rhus aromatica*), and Mexican buckeye (*Ungnadia speciosa*). This cover type occupies a total of about 528 ac at CPNPP or approximately 7 percent of the site. Transect data, collected by Luminant in 2007 (Luminant 2009a) on the peninsula where new cooling towers would be located, show that mixed hardwood forest covers approximately 16 percent of the transect lines surveyed.

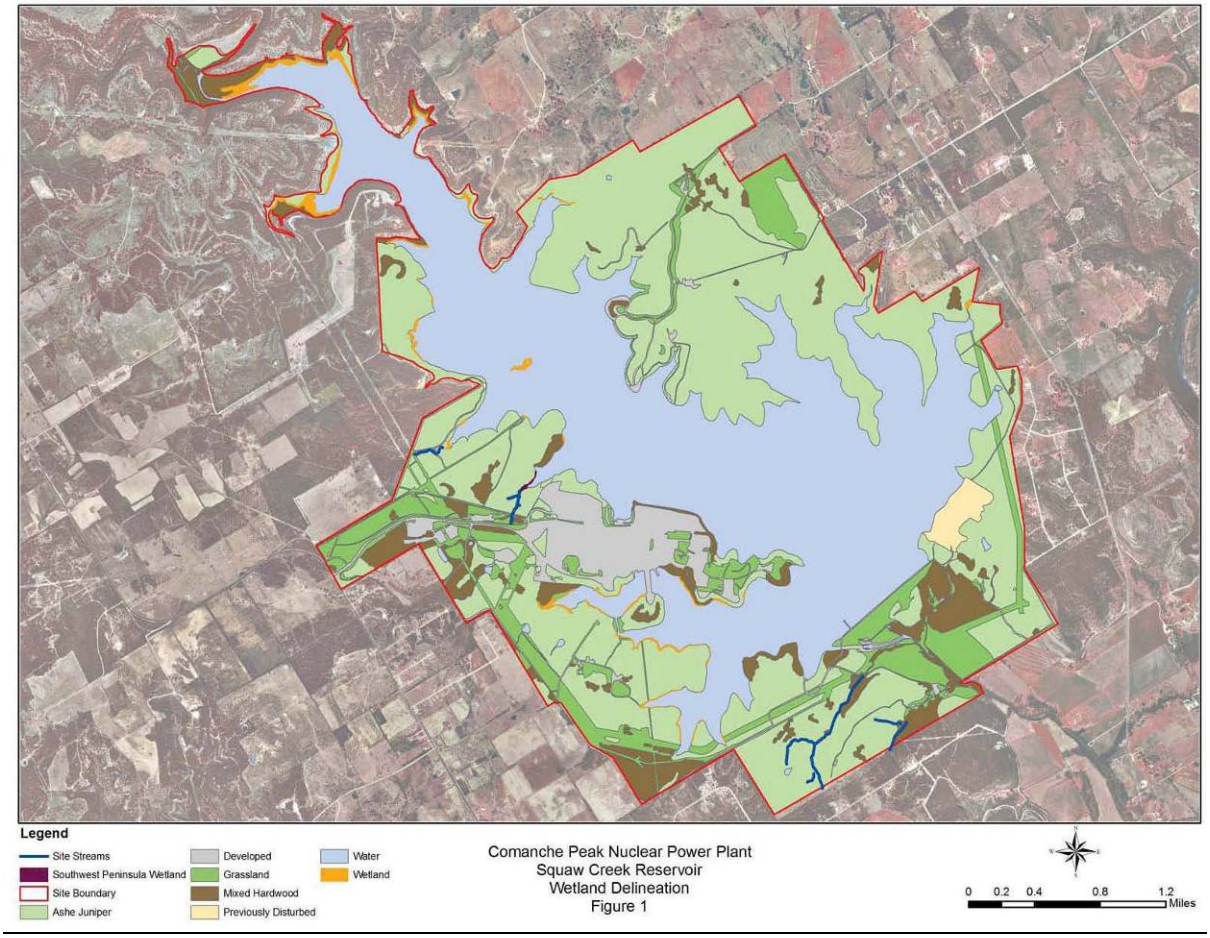

Figure 3. Ecological Vegetation Cover Type Map of the CPNPP Site (Luminant 2009a; Enercon 2009).

Grassland. Grasslands within the site are dominated by either a variety of native grasses, such as big (*Andropogon gerardii*), little, and silver bluestem; gramas (*Bouteloua* spp.); Texas wintergrass; and some forbs, or by monocultures of turf grass such as Bermuda grass (*Cynodon dactylon*) or fescues(*Festuca* spp.). Bermuda grass lawns are common at the site near the facility entrance and around buildings. Fescue is a genus of more than 300 species of tufted grasses commonly planted to supplement native grass in pastures. This cover type occupies a total of about 698 ac at CPNPP or approximately 9 percent of the site. Transect data collected by Luminant in 2007 (Luminant 2009a) on the peninsula where new cooling towers would be located show that grassy openings cover about 24 percent of the transect lines surveyed.

Previously Disturbed. These are areas within the site that are either mechanically or naturally disturbed and consist either of bare ground or weedy plant species that are indicators of disturbance. This cover type occupies a total of about 60 ac at CPNPP or less than 1 percent of the site.

Developed Areas. Developed areas within the site consist of office buildings, reactors and related facilities, switchyards, and storage facilities as well as pavement or gravel for parking lots and roads. Also included within this cover type are the dam, spillway, structures related to

the dam, and the Safe Shutdown Impoundment and its equalization channel. This cover type occupies a total of about 439 ac at CPNPP or approximately 6 percent of the site.

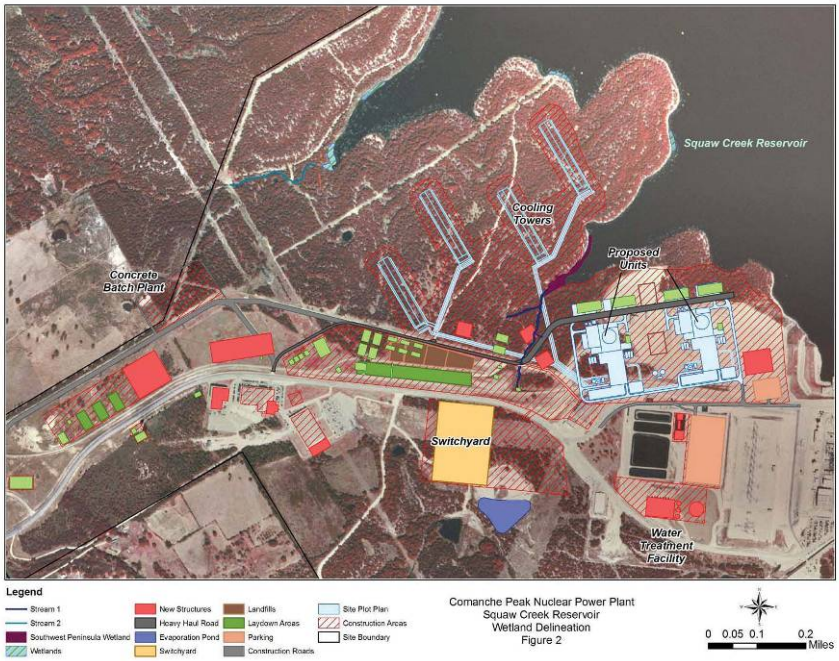

Figure 4. Peninsula where new cooling towers for Units 3 and 4 would be located (Enercon 2009).

Open Water. The open water type at CPNPP consists primarily of Squaw Creek Reservoir (SCR), the Safe Shutdown Impoundment, evaporation ponds for nonradioactive waste water, and an emergency spillway. Because of SCR, open water is the most extensive cover type on the site and occupies a total of about 3125 ac or approximately 39 percent.

Wetlands. Wetlands are areas transitional between land and open water. At CPNPP small areas of wetland occur primarily in and along the shoreline of coves on SCR. Wetlands occupy a total of about 53 ac at CPNPP or less than 1 percent of the site.

The electric transmission lines and pipelines originating from CPNPP cross forested and range habitats typical of north-central Texas, predominantly grassland with patches of deciduous and evergreen forest. Acreages of vegetation types likely to be crossed by new transmission and pipeline rights-of-way are shown in Table 2. Acreages of vegetation types to be crossed cannot be determined precisely until the exact right-of-way boundaries are determined.

Below is a brief description of the construction, operation, and related activities that could potentially affect federally listed threatened or endangered terrestrial species, should any be present. The determination of potential effects was based on habitat affinities and life history considerations, as well as the nature and spatial and temporal considerations of the activities.

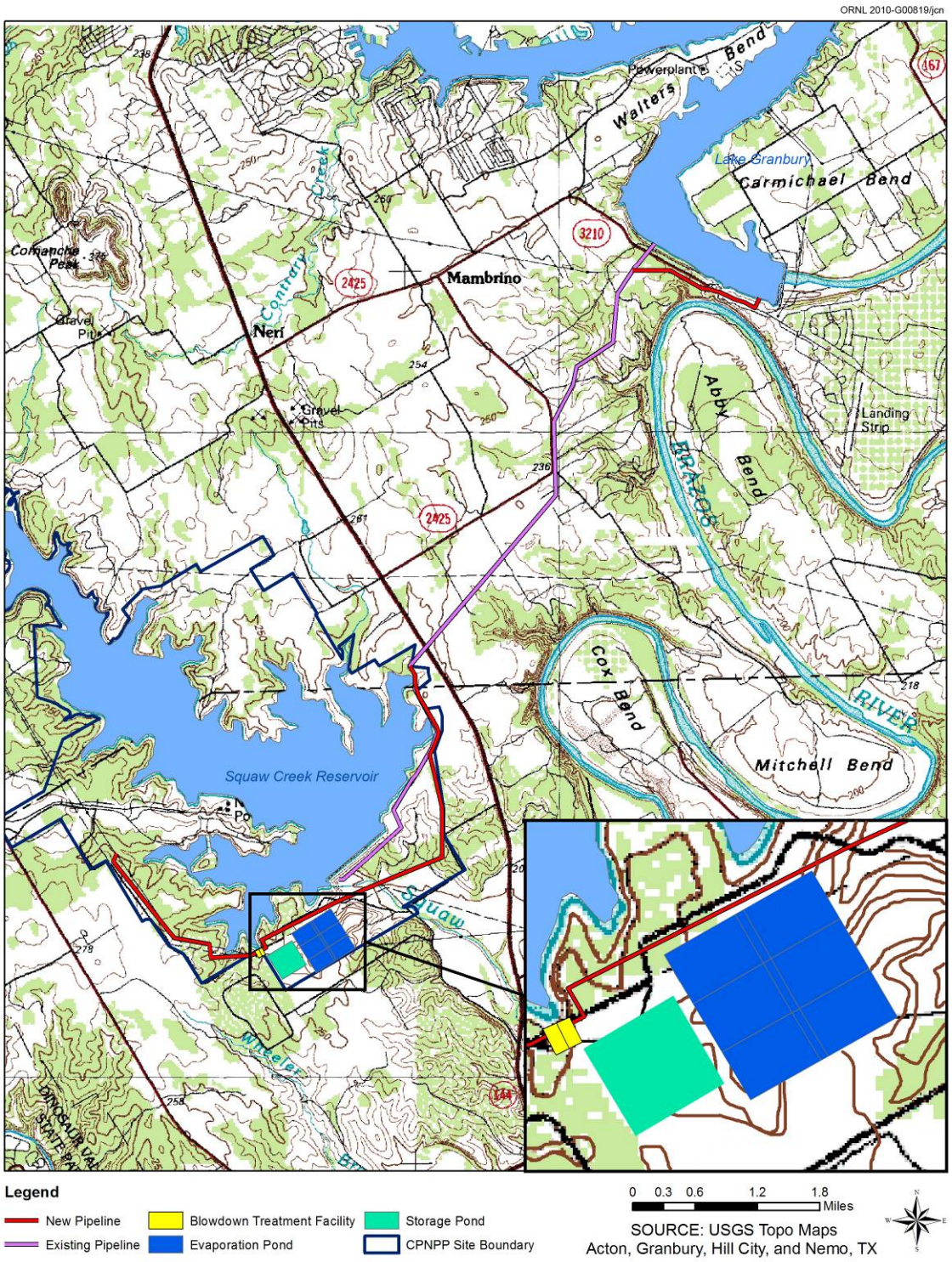

Figure. 5. Approximate location of 400 ac BDTF and associated evaporation and storage ponds (adapted from Luminant 2009a).

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Table 2. Acreages of vegetation types likely to be crossed by new transmission and pipeline right-of-way.

Cover Type	Whitney	DeCordova	Cooling Water Pipeline
Water	3.1	11.0	0.2
Developed	20.7	12.9	7.7
Barren Land	0.4	0.9	0.2
Deciduous Forest	176.1	10.1	6.3
Evergreen Forest	137.0	3.1	3.7
Mixed Forest	0.0	0.0	0.0
Scrub/Shrub	0.0	0.0	0.0
Grassland	550.0	107.5	31.4
Pasture	35.8	1.3	0.0
Cropland	7.6	0.0	0.4
Woody Wetlands	22.9	1.6	0.1
Total	953.6	148.4	50.0

Source: Luminant 2009a.

3.0 Proposed Federal Actions

The proposed federal actions are (1) NRC's issuance of two COLs for the construction and operation of two new nuclear reactors at the proposed CPNPP site pursuant to Title 10 of the Code of Federal Regulations (CFR), Section 52.97 (10 CFR 52.97),, and (2) the USACE's issuance of a DA permit pursuant to Section 404 of the Clean Water Act, and Section 10 of the Rivers and Harbors Act of 1899.

The NRC, in a final rule dated October 9, 2007 (72 FR 57416), limited the definition of "construction" in 10 CFR 50.10 and to those activities that fall within its regulatory authority in 10 CFR 51.4. Many of the activities required to build a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Examples of preconstruction activities include the clearing and grading, building support buildings, and building transmission lines. Preconstruction activities may take place before the application for a COL is submitted, during the staff's review of a COL application, or after a COL is granted. Although preconstruction activities are outside the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies. The distinction between construction and preconstruction is not carried forward in this BA, and both are discussed jointly as construction for the purposes of this BA prepared jointly by NRC and USACE.

The 7950-ac CPNPP site lies around SCR (Figure 6). Units 3 and 4 would be placed on the peninsula where Units 1 and 2 are located in areas of previously disturbed habitat and some adjoining undeveloped land. Cooling towers would be built on undisturbed land on a peninsula adjacent to and west of the new units, and the BDTF would be located in largely undisturbed habitat

Figure 6. Location of proposed CPNPP Units 3 and 4 in relation to existing Units 1 and 2 (Luminant 2009a).

southeast of Units 1 and 2 below the SCR dam. The BDTF would remove salt via evaporation and reverse osmosis from used cooling water before returning it to its source, Lake Granbury. The DeCordova transmission line would leave the site and extend northeast to DeCordova. The Whitney transmission line would leave the site along a route to the south to Whitney (Figure 2). The cooling water pipeline would leave the site and extend northeast to Lake Granbury. Exact routes for these proposed new lines have not yet been determined. Specific locations would be

determined through a Routing Study Process considering environmental impacts, conducted under review of the Public Utility Commission of Texas (Luminant 2009a).

The development (construction and preconstruction) and operation activities that could affect federally listed species include the following:

Development (Construction and Preconstruction)

- Removal (clearing) of habitat used by federally threatened or endangered terrestrial species for development of reactors and support structures.
- Removal (clearing) of habitat used by federally threatened or endangered terrestrial species for development of new transmission and pipeline rights-of-way.
- Fragmentation of habitat and interference with movement of wildlife.
- Generation of sediment and fugitive dust.
- Generation of noise by construction equipment and personnel.
- Possible avian collisions with tall equipment or structures such as construction cranes or transmission towers.

Operation

- Potential impacts of noise, salt drift, fogging, and icing from operation of reactor cooling systems, should suitable habitat be present.
- Potential impacts of required periodic vegetation maintenance on reactor grounds and transmission line and pipeline rights-of-wayt.

Construction and Preconstruction: A total of 675 ac at the CPNPP site would be affected by construction and preconstruction activities for Units 3 and 4 and support structures, including the cooling towers and BDTF and associated evaporation ponds (Luminant 2009a). Of this area 125 ac would be revegetated, and 550 ac would be occupied by various structures. The habitat that would be affected consists of 413 ac of Ashe juniper, 63 ac of mixed hardwood, 94 ac of grassland, and 105 ac that has already been developed (Luminant 2009a). These activities would result in loss of habitat in the areas developed as structures, and alteration of the remaining affected areas which would be revegetated. During clearing activities, as well as throughout preconstruction and construction work, nearby wildlife could be temporarily displaced and disturbed by noise.

Building power lines and pipelines on new rights-of-way would result in a relatively small amount of permanent habitat loss for towers, access roads, and other structures. Most of the land crossed would not be occupied by permanent structures. Tower locations could be adjusted in the field to avoid particularly ecologically sensitive areas. Forested areas would be initially cleared, resulting in loss of forest habitat and fragmentation of remaining forest areas. Grassland areas would not be permanently altered, but all new right-of-way would require vegetation management to keep woody species from becoming established and interfering with operations. As shown in Table 2, forested area to be crossed and managed would be approximately 313 ac for the Whitney transmission line, 13 ac for the DeCordova transmission line, and 10 ac for the cooling water pipeline. Actual acreages cannot be determined until exact routes for these lines have been selected.

Operation: Wildlife present in locales adjacent to areas cleared by project activities could be affected by operation of the new structures associated with Units 3 and 4. Potential impacts from operation of cooling towers and the BDTF include increased fogging, icing, and salt drift

from evaporated water. Wildlife present along new transmission line and pipeline rights-of-way would be affected by periodic vegetation management of these areas.

The transmission lines to be constructed are 385-kV (Luminant 2009a). This voltage is relatively small for major transmission lines; no electromagnetic effects to nearby flora and fauna would be expected (NRC 1996).

4.0 Species Descriptions

Federally threatened or endangered species listed by USFWS as occurring in Hood, Somervell, or Bosque counties are all birds: black-capped vireo (*Vireo atricapillus*), golden-cheeked warbler (*Dendroica chrysoparia*), and whooping crane (*Grus americana*) (USFWS 2010). There are two additional species (both fish) potentially occurring in Hood and Somervell Counties that are designated by USFWS as Federal candidates for listing: the sharpnose shiner (*Notropis oxyrhynchus*) and the smalleye shiner (*Notropis buccula*). Candidate species are under consideration for listing but are not currently protected under the ESA: therefore they are not addressed further in this BA. No critical habitat for these species has been designated within these counties (50 CFR Part 17.11).

There are no known Federally listed aquatic species recorded as occurring in the three counties in which CPNPP Units 3 and 4 (Hood and Somervell Counties) and the proposed new transmission line ROWs (Somervell and Bosque Counties) would be located.

4.1 Whooping crane

The whooping crane is listed as occurring in Hood, Somervell, and Bosque Counties (USFWS 2010). Critical wintering habitat for the whooping crane lies approximately 525 mi southwest of the site at the Aransas National Wildlife Refuge. This species has not been observed on the CPNPP site (Luminant 2009a). No known occurrences of whooping cranes have been reported within a 10-mi radius of the CPNPP site, or the proposed powerline and pipeline corridors (TPWD 2009), and they are not likely to use the inland habitats found on the CPNPP site for foraging, roosting, or nesting. Therefore they are not considered further in this BA.

4.2 Black-capped vireo

Black-capped vireos are small, about 4.5 inches size, insectivorous, migratory songbirds found only in Oklahoma and Texas. Black-capped vireos prefer patchy woodlands or shrublands. Males are characterized by olive-green backs, white stomachs, and black caps with a white patch around a reddish eye. Females are more cryptic in color than males with dark coloration along their backs (Campbell 2003, Grzybowski 1995, USFWS 1991).

The black-capped vireo was Federally listed as endangered in 1987 due to threats from brown-headed cowbird (*Molothrus ater*) nest parasitism and loss of habitat due to such factors as urbanization, grazing, range improvement, and succession (52 FR 37420). A more recent status review of this species recommended the black-capped vireo be downlisted to Federally threatened due to finding that the known population is much larger than at the time of listing, and that while original threats to the species still exist, their magnitude has decreased (USFWS 2007).

Black-capped vireos arrive in Texas from mid-March to mid-April. Breeding habitat is quite variable across its range, but generally consists of shrublands with a distinctive patchy structure (USFWS 2007). They nest in areas with 30–60 percent cover of deciduous trees. Their

preferred habitat contains woody plants in excess of 6 ft high with cover extending to the ground. Open grasslands play an important role in habitat, providing foraging areas for the vireos (Campbell 2003, Graber 1961). Home ranges vary from 3–10 ac (Campbell 2003, Graber 1961). Males and females both contribute to nest site selection and building, often in a fork of a deciduous tree branch (Grzybowski 1995). Black-capped vireos may live for more than five years, and usually return year after year to the same territory. They begin to migrate to the wintering grounds on Mexico's western coast in July and are usually gone from Texas by mid-September (USFWS 2007).

Habitat losses have occurred through development, overbrowsing, and suppression and alteration of natural disturbance regimes. Cowbird nest parasitism has reduced vireo reproduction in many areas (USFWS 1991). Much of the current threat can largely be attributed to the invasion and growth of juniper species, especially Ashe juniper (USFWS 2007). Juniper invasion has contributed to an overall afforestation of rangeland habitats throughout much of the species' breeding range (USFWS 2007). Suppression of fire has favored the spread of junipers over fire-adapted *Quercus* and *Rhus* species, resulting in loss of black-capped vireo habitat (USFWS 1991).

4.3 Golden-cheeked warbler

Golden-cheeked warblers are small migratory insectivorous songbirds, about 5 in long, which are characterized by yellow cheeks bisected by a black streak extending across the eye. Males and females are similar in appearance, although females are drabber in color (Campbell 2003, Ladd and Gass 1999). They are endemic to Texas during the breeding season, and certain upland sites within mature Ashe juniper forest at CPNPP may provide appropriate habitat (Luminant 2009a). During non-breeding season the range includes portions of Mexico, Guatemala, Honduras, and Nicaragua (USFWS 1992).

The golden-cheeked warbler was Federally listed as endangered in 1990 (55 FR 53153) due to habitat loss and fragmentation resulting from urban encroachment into its range and widespread clearing of juniper as a range management practice. Brown-headed cowbird parasitism has increased in magnitude as habitat becomes more fragmented. A 5-year review to ensure that the classification of this species is still accurate was announced on April 21, 2006 (71 FR 20714); to date its listing status has not changed (USFWS 2010).

Golden-cheeked warblers are dependent on Ashe juniper, but also require stands mixed with oaks, elms, and other hardwoods in relatively moist areas, such as steep canyons and slopes, and adjacent uplands (USFWS 1992). Kroll (1980) reported that occupied golden-cheeked warbler habitats had lower juniper-oak ratio (1.35:1), contained junipers over 40 years old, and had lower understory diversity than unoccupied areas. Older Ashe junipers have peeling bark that is an essential component of golden-cheeked warbler nest construction. Older Ashe junipers are utilized as calling sites during mating.

Breeding territory size estimates range from about 3.2 ac (Pulich 1976) to about 19.8 ac (Kroll 1980) per pair. Wahl et al (1990) reported the median density for all study sites with golden-cheeked warblers to be 16.5 ac per pair.

After females arrive in March, mating begins and extends until April or May. Decline of golden-cheeked warblers is attributed to habitat loss and fragmentation due to range improvement practices, rapid urban development, flood control, and construction of impoundments (Ladd and Gass 1999). Nest parasitism by the brown-headed cowbird, and competition with blue jays (*Cyanocitta cristata*) have also contributed to population declines (Campbell 2003, Engels and Sexton 1994). The USFWS along with TPWD have implemented land-owner management

plans and Safe Harbor Agreements to protect and enhance existing and potential golden-cheeked warbler habitat (Campbell 2003, Ladd and Gass 1999, USFWS 1992).

5.0 Potential Environmental Effects of the Proposed Actions

This section describes potential impacts to black-capped vireo and golden-cheeked warbler from development and operation of the proposed Units 3 and 4 at the CPNPP site.

5.1 Black-capped vireo

CPNPP site: Ten occurrences of black-capped vireo have been reported in the Texas Natural Diversity Database (TXNDD) for the area within 10 mi of the CPNPP site and new transmission and pipelines (TPWD 2009). None of the reported occurrences, however, is closer than about 2.5 mi to the CPNPP site.

Nevertheless, to determine whether black-capped vireos might use habitats at the site, Luminant conducted informal surveys during April 2007 at various times of the day over the course of three days at CPNPP concentrating on the peninsula area proposed for construction of the new cooling towers (Figure 4) (Luminant 2009a). Survey methods consisted of walking transects on east/west axes spaced approximately 100 m (328ft) apart. Black-capped vireos were not audibly or visually identified, and no suitable breeding habitat was noted (Luminant 2009a). During an early May visit in 2007, a woven, pendulous nest was noted in a low tree branch. This nest may have been constructed by an unidentified vireo species, or possibly by a golden-cheeked warbler (Luminant 2009a). In April and May of 2008 the same area was surveyed again, but this time looking specifically for golden-cheeked warblers; presence of other bird species was noted and black-capped vireos was not reported (PBS&J 2008).

DeCordova power transmission line, and cooling water pipeline: Neither the DeCordova transmission line right-of-way, nor the cooling water pipeline right-of-way, lie closer than about 2.5 mi to any TXNDD reported occurrence of black-capped vireo (TPWD 2009).

Whitney power transmission line: Recorded occurrences of black-capped vireo have been documented about 2.5 mi southwest of the CPNPP site in Dinosaur Valley State Park where breeding populations of both species occur (TPWD 2009). The Whitney transmission line right-of-way might pass very close to, or possibly through, a small portion of the northwest corner of the park. Depending on the exact right-of-way that Oncor ultimately chooses, black-capped vireo habitat in Dinosaur Valley State Park, and possibly at other locations along the Whitney right-of-way, could be noticeably affected. Suitable breeding habitat could be lost, and nest parasitism by brown-headed cowbird could be increased due to additional forest fragmentation.

Regulatory Coordination: Oncor would coordination with TPWD and USFWS to determine the potential for impacts to black-capped vireo would be undertaken as part of the environmental review process of the Electric Reliability Council of Texas (ERCOT) and the Public Utility Commission of Texas (PUCT) once it selects the exact right-of-way (Luminant 2009a). It is likely that with possible rerouting of the right-of-way, adjustment of tower placement, and timing of site preparation activities to avoid the breeding season, impacts to black-capped vireo could be minimized or avoided. The review team expects that Oncor could adjust the exact ROW location and tower placement, as well as time project activities to avoid the breeding season, in a way that avoids or minimizes impacts to black-capped vireo.

5.2 Golden-cheeked warbler

This section describes potential impacts to golden-cheeked warbler from development and operation of the proposed Units 3 and 4 at the CPNPP site.

CPNPP site: Thirteen occurrences of golden-cheeked warbler have been reported in the Texas Natural Diversity Database (TXNDD) for the area within 10 mi of the CPNPP site and new transmission and pipelines (TPWD 2009). None of these, however, is closer than about 2.5 mi to the CPNPP site.

Nevertheless, to determine whether golden-cheeked warblers might use habitats at the site, an informal survey for them was conducted during April 2007 at various times of the day over the course of three days at CPNPP concentrating on the peninsula area proposed for construction of the new cooling towers (Figure 7). Survey methods consisted of walking transects on east/west axes spaced approximately 100 m (328 ft) apart. Golden-cheeked warblers were not audibly or visually identified (Luminant 2009a). During a separate visit in early May in 2007, a woven, pendulous nest was noted in a low tree branch. This nest may have been constructed by an unidentified vireo species, or possibly by a golden-cheeked warbler (Luminant 2009a). In 2007 on the last day of the breeding season, May 15th, a targeted presence/absence survey for golden-cheeked warblers on the peninsula area was conducted, and again no visual or audio confirmation of golden-cheeked warbler presence was noted (PBS&J 2007). The biologist conducting the 2007 survey noted that most of the area of the peninsula would not be considered golden-cheeked warbler habitat due to the lack of a 20-percent mixture of hardwoods (PBS&J 2007). However, at a stream confluence at the southern base of the peninsula contained a slight mixture of hardwoods along the stream channels that would be considered as having very minimal characteristics associated with golden-cheeked warbler habitat (PBS&J 2007).

In April and May of 2008, during the breeding season for golden-cheeked warbler, a second targeted presence/absence survey was conducted to USFWS protocol on the peninsula area (Figure 7) (PBS&J 2008). No golden-cheeked warblers were observed within the project survey area (PBS&J 2008). As in the 2007 survey, most of the peninsula area was judged not to meet golden-cheeked warbler habitat requirements, but one 3.7 ac area of a mixture of Ashe juniper and hardwoods at the confluence of three streams (outlined in red on Figure 7) was considered to exhibit marginal golden-cheeked warbler nesting habitat characteristics (PBS&J 2008). The investigators did not consider this area to be favorable for use as breeding/nesting habitat, however, because:

> These areas are lacking in extended habitat characteristics (canopy cover, hardwood diversity, and structural characteristics) beyond the vegetation surrounding the stream channel perimeter, and are therefore isolated from any nearby populations. The sum of the primary survey area (i.e., the potential golden-cheeked warbler habitat) is 3.7 acres, and is spread out across three thin corridors; this area is considered to be highly fragmented and too small in size to support favorable nesting conditions (PBS&J 2008).

The 3.7 ac area was discussed at a scoping meeting with USFWS and TPWD held at CPNPP on February 2, 2009. It was noted that this area is surrounded by a small wetland, and USFWS recommended avoiding the wetland by an additional 100 ft buffer to provide a wildlife corridor in addition to a vegetative run-off “filter” to protect water quality (Edwards 2009). Current project plans, however, show that much of this area would be lost to project development (Enercon 2009).

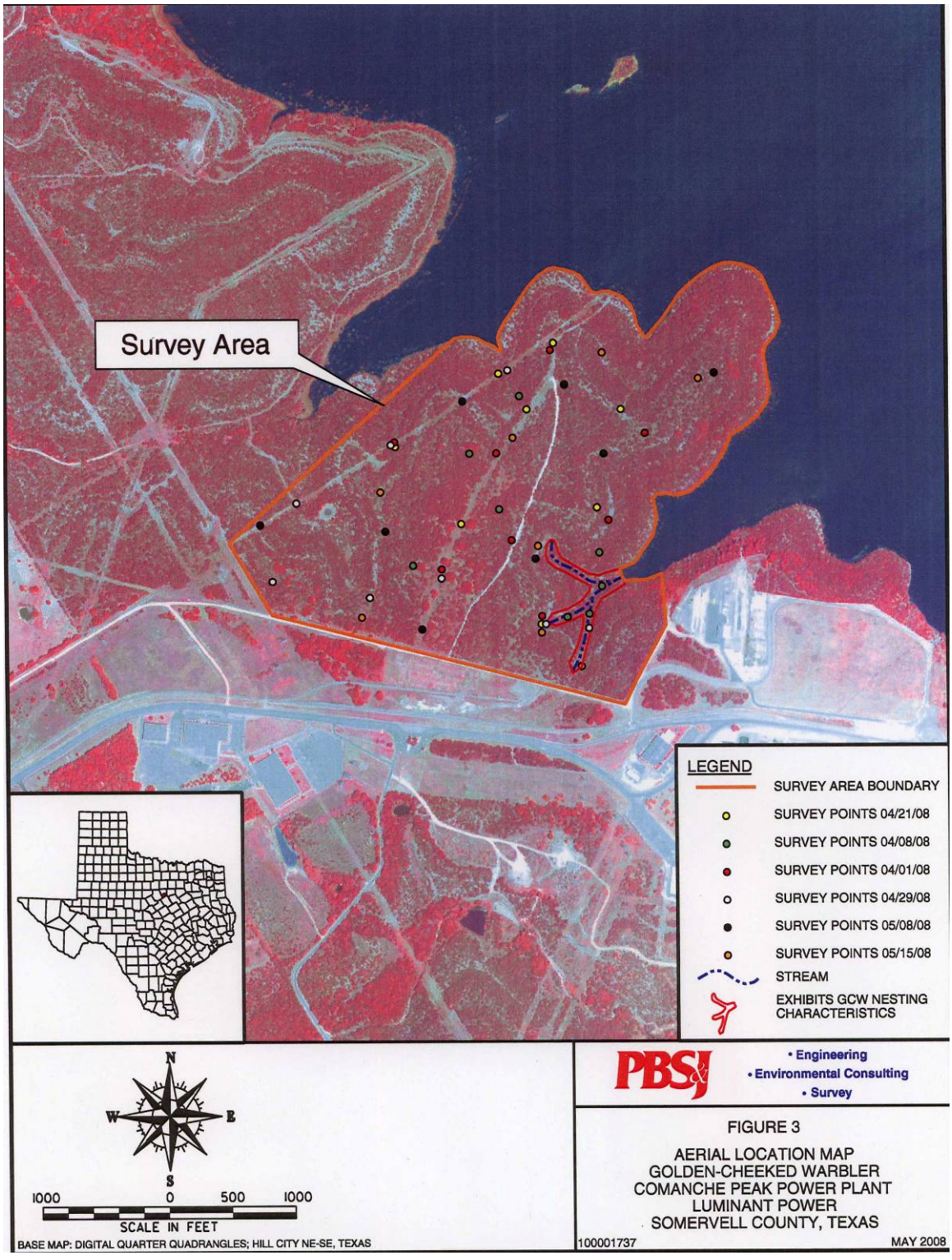

Figure 7. Area surveyed in targeted golden-cheeked warbler survey conducted to USFWS protocol in 2008 (PBS&J 2008).

1

An additional portion of the CPNPP site to be directly affected by development that could possibly contain suitable habitat for the golden-cheeked warbler is the 400-ac area that would be occupied by the BDTF and associated evaporation ponds (Figure 6). This area contains Ashe juniper habitat and smaller areas of mixed hardwood (Figure 4). To learn of habitat suitability, infrared aerial photographs of the area were examined to determine which areas would provide potential nesting habitat for the golden-cheeked warbler based on habitat descriptions provided by the USFWS (Luminant 2009a). Photographic signatures of tree species were used to identify areas that might require focused surveys. Areas were identified that had a mixture of Ashe juniper and deciduous hardwoods. These areas were ground-truthed by a visual qualitative analysis of density, canopy cover, and tree age on November 14, 2007 to determine if habitat was present that would be suitable for golden-cheeked warblers (Luminant 2009a). The comparison was based on percent cover of hardwood and evergreen canopy from point-transect data taken within a known golden-cheeked warbler site in Dinosaur Valley State Park. It was determined that the BDTF area did not contain the density and maturity of Ashe junipers necessary to qualify as suitable for golden-cheeked warblers (Luminant 2009a). Canopy cover in and adjacent to the BDTF was found to be only about 20 percent, which is less than the 35 percent minimum thought to be required (Luminant 2010a). Additional site reconnaissance performed on February 4, 2009 reconfirmed absence of suitable golden-cheeked warbler habitat in the area of the BDTF (Luminant 2009a).

It is unknown whether the additional Ashe juniper and hardwood cover type areas in the vicinity of the proposed BDTF, especially the isolated peninsula to the north (see Figure 4), could be suitable golden-cheeked warbler habitat. No golden-cheeked warbler surveys are known to have been performed in these areas. Depending on the location and design chosen for the BDTF, areas outside of the 400 ac could be affected by salt drift. Although salt drift from the misting system proposed to evaporate water at the BDTF has not been modeled in detail, salt concentrations leaving the misters would be approximately 576 kg/min (Luminant 2009a).

Luminant estimates that salt drift from the misting units could be deposited up to 1300 ft from the source with a wind speed of 10 mph (Luminant 2009b). The tentative location of the evaporation pond is close to the CPNPP site boundary (Figure 5) and vegetation in the vicinity is primarily Ashe juniper woodland - savanna (Fig 3). Although the exact location of the BDTF has not yet been determined, Luminant provided a conceptual sketch of the location of the ponds within the 400 ac to be occupied by the BDTF (Figure 8) (Luminant 2010b).

Luminant's response states that a salt fence would surround the evaporation ponds, and a 500 ft wide buffer would be provided between the first bank of misters and the outside edge of the evaporation ponds to provide sufficient distance between the mister nozzles and the salt fence barrier to ensure proper functioning of the salt fence to prevent drift (Luminant 2010b). The salt fence referred to by Luminant (Luminant 2010c) would be a 5 m (16 ft) high agricultural shade cloth netting which would be attached to a framework at the top, but loose at the bottom so it could blow in the wind to cause the fabric to shed accumulated salt. The manufactor of the netting claims that salt passing through the netting falls out within one meter (3 ft) (Turbomist 2010). Further, Luminant states that precautions will be taken to contain the salt within the BDTF by using directional spray misting units in addition to the salt fences (Luminant 2010a). With these measures in place, Luminant estimates that salt deposition is anticipated to be less than 1 kg/ha/yr beyond the 400 ac of the BDTF (Luminant 2010c), which is less than what the NRC recognized as capable of injuring vegetation (NRC 2000).

The information provided by Luminant (Turbomist 2010) is not extensive enough to completely eliminate uncertainty regarding the potential for salt to be deposited beyond one meter from the salt fence. Luminant states that without the salt fence salt could drift 1300 ft from the misters (Luminant 2010b). If salt drifts to that distance then the review team estimates that deposition

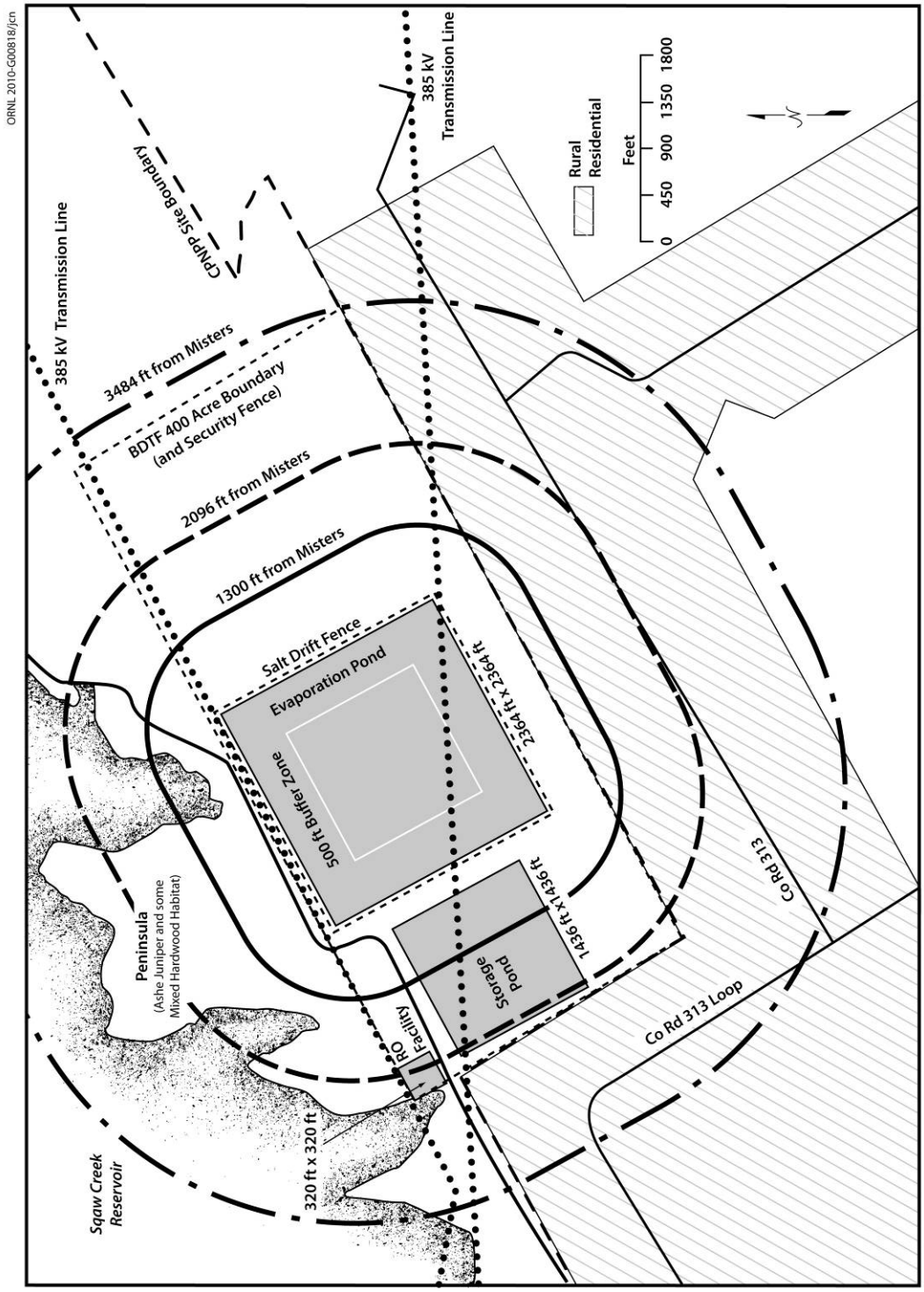

Figure 8. Schematic Layout of the Proposed Blowdown Treatment Facility Showing Distances from the Misters to Nearby Locations (adapted from Luminant 2010d).

could spread over an area of about 199 ac beyond the evaporation pond (Quarles 2010). Much of this areal extent would be within the 400-ac area to be cleared for building the BDTF where the native vegetation would have been removed.

Potential for salt drift may be greater than 1,300 ft, however. A study of salt deposition from an evaporative spray system using the same general type of mister proposed by Luminant found that deposition rates of salt were substantially increased at a distance of 2,096 to 3,484 ft surrounding the misters (Alonso et al. 2005). Based on Luminant's sketch of mister locations (Luminant 2010b) the review team estimates that this could result in drift over a total area beyond the evaporation pond of about 494 to 1226 ac. The area of increased salt deposition, assuming drift over the range of 1,300 to 3,484 ft, would extend over some or all of a peninsula to the north of the proposed BDTF location and covered by Ashe juniper woodland – savanna and mixed hardwood forest (Figure 3).

Considering the limited case history data available to the review team regarding the misters and the salt fence, it is uncertain if the measures (including but not limited to salt fence, and unidirectional operation of the misters) proposed by Luminant could completely prevent salt drift from the BDTF from affecting nearby natural vegetation. Salt deposition potential from the BDTF has not been quantified further because the facility is only in conceptual design phase. Due to the high volumes of salt that would be processed by the facility, even a small percentage loss of salt to the surrounding environment could have the potential to damage vegetation.

Depending on the exact extent of drift that results from operation of the BDTF, some of the Ashe juniper woodland - savanna and mixed hardwood forest habitat on the isolated peninsula to the north of the BDTF could be susceptible to salt drift injury. If this area contains suitable habitat for golden-cheeked warbler, then salt drift could affect this habitat and thereby affect golden-cheeked warbler. Otherwise, impacts to golden-cheeked warbler would be minimal.

DeCordova power transmission line, and cooling water pipeline: Neither the DeCordova transmission line right-of-way, nor the cooling water pipeline right-of-way, lies closer than about 2.5 mi to any TXNDD reported occurrence of golden-cheeked warbler (TPWD 2009). Recorded occurrences of golden-cheeked warbler, however, as well as black-capped vireo, have been documented about 2.5 mi southwest of the CPNPP site in Dinosaur Valley State Park where breeding populations of both species exist (TPWD 2009). The Whitney transmission line right-of-way might pass very close to, or possibly through, a small portion of the northwest corner of the park. Depending on the exact right-of-way that Oncor ultimately chooses, golden-cheeked warblerin Dinosaur Valley State Park, and possibly at other locations along the Whitney right-of-way, could be affected. Suitable breeding habitat could be lost, and predation by brown-headed cowbird could be increased due to additional forest fragmentation.

Regulatory Coordination: Oncor would coordinate with TPWD and USFWS to determine the potential for impacts to golden-cheeked warbler as part of the environmental review process of ERCOT and PUCT once it selects the exact location of the new right-of-way (Luminant 2009a). The review team expects that Oncor could adjust the exact ROW location and tower placement, as well as time project activities to avoid the breeding season, in a way that avoids or minimizes impacts to golden-cheedked warbler.

6.0 Cumulative Impacts to Federall Protected Species

In addition to impacts from construction, preconstruction, and operation, the following cumulative analysis also considers other past, present, and reasonably foreseeable projects that could affect the black-capped vireo and golden-cheeked warbler. For purposes of this cumulative analysis, a geographic area of interest is defined as Somervell, Hood, and Bosque

Counties. These counties encompass the CPNPP site, anticipated transmission line and pipeline rights-of-way, and adjoining areas. They lie almost completely in the Limestone Cut Plain of the Western Cross Timbers ecoregion (Griffith et al. 2004). They are expected to encompass those other projects capable of interacting with the CPNNP Units 3 and 4 project to affect the the black-capped vireo and golden-cheeked warbler.

Prior to settlement, the landscape in the three counties existed as grassland or open live oak savanna that supported herds of bison and other herbivores. Introduction of domestic livestock, farming, and wildfire control substantially altered the landscape. Today the landscape consists of a mosaic of forest, woodland, savanna, and prairie. The grassland with scattered blackjack oak and post oak trees is used mostly for rangeland and pastureland, with some areas of woody plant invasion and closed forest. Habitats favored by the black-capped vireo and golden-cheeked warbler remain in only scattered locations.

Since establishment of CPNPP Units 1 and 2, development in the three counties has continued and additional habitat for the black-capped vireo and golden-cheeked warbler has been lost or modified by farming, ranching, residential development, river and watershed projects, and transportation projects. Oil production has been a major activity in the area for over 80 years (Griffith et al. 2004), and oil and natural gas exploration and production continue. These trends are expected to continue over the projected operating life of proposed Units 3 and 4.

Current and reasonably foreseeable actions within the three counties that could adversely affect the black-capped vireo and golden-cheeked warbler in a similar way to the CPNPP Units 3 and 4 project include multiple proposed transportation projects, future urbanization, and continued oil and gas exploration and development. Other future actions that would contribute to cumulative effects include building and upgrading utility lines, including but not limited to those for Units 3 and 4; new road development and expansion; continued industrial and urban development; increased outdoor recreation; and nonpoint source runoff from agriculture, ranching, and development.

Continued urbanization is a contributing factor to the losses of habitat for the black-capped vireo and golden-cheeked warbler. The Texas State Data Center (TSDC) projects that the population in a six-county area surrounding the CPNPP site (including Bosque, Erath, Hood, Johnson, Somervell, and Tarrant Counties) will increase by 41.5 percent by the year 2040 (TSDC 2009). The highest growth in the six-county area is projected to occur in areas close to Fort Worth; however, the more outlying counties are still expected to experience substantial growth. Even with the anticipated growth, the area around the CPNPP site is likely to continue to be predominantly rural in character, with some areas still providing habitat for black-capped vireo and golden-cheeked warbler. Recent urbanization in this area has occurred primarily in and around the cities of Granbury and Glen Rose. This trend is likely to continue, with most of the growth occurring in Hood County around and northeast of Lake Granbury, due primarily to recreation home development and commuting patterns associated with Fort Worth. The preconstruction, construction, and operations workforce for CPNPP Units 3 and 4 would make only a minor contribution to this increase in the urban growth of the region. The cumulative urbanization in the geographic area of interest could reduce habitat available for black-capped vireo and golden-cheeked warbler.

Global climate change is another factor contributing to the loss or degradation of habitat for the black-capped vireo and golden-cheeked warbler. The report on Global Climate Change Impacts in the United States, provided by the U.S. Global Change Research Program, summarizes the projected impacts of future climate changes in the U.S. (Karl et al. 2009). The report divides the U.S. into nine regions. The CPNPP site is located in the Great Plains region. The GCRP climate models for this region project continued warming in all seasons and an increase of as

much as 12°F from 2000 to 2090. Additionally, climate models project that there will tend to be less rainfall in this area. The GCRP states that the precipitation could possibly alter the character of terrestrial habitats in the area, including habitats used by the black-capped vireo and golden-cheeked warbler.

The actions noted above may potentially affect black-capped vireo and golden-cheeked warbler by decreasing or degrading available habitat. As noted in Chapter 4 of this BA, the major threats to both species are habitat modification, habitat loss, and habitat fragmentation due to range management practices and continued development. As noted in Chapter 5 of this BA, one of the expanded transmission line rights-of-way required for CPNPP Units 3 and 4 (the Whitney right-of-way) might pass through habitat occupied by both species. In addition, habitat potentially suitable for the golden-cheeked warbler could be altered by salt drift from the BDTF. Habitat loss and alteration due to the CPNPP project activities noted above, combined with effects from other projects, including non-Federal projects, in the area of geographical interest could be sufficient to noticeably alter populations of both species.

Because suitable black-capped vireo habitat is not available on or close to the CPNPP site, DeCordova transmission line right-of-way, or cooling water pipeline right-of-way, activities proposed for those locations would not contribute to the cumulative effects on black-capped vireo. Activities on the Whitney transmission line right-of-way could however contribute substantially to cumulative effects on the black-capped vireo. Activities on both the site and transmission line rights-of-way could substantially contribute to cumulative effects on the golden-cheeked warbler.

7.0 Conclusions

The following section presents the conclusions of this BA.

7.1 CPNPP site, DeCordova power transmission line and cooling water pipeline

Black-capped vireo

No habitat was seen in these areas; therefore, development and operation of project facilities in these locations is not likely to adversely affect black-capped vireos. Therefore, the review team concludes that these project elements would have no effect on the black-capped vireo.

Golden-cheeked warbler

On-site surveys did not indicate that golden-cheeked warblers are present in the areas surveyed; only marginal habitat was observed. However, possible golden-cheeked warbler habitat may exist in areas subject to possible salt drift from the BDTF. Should any of these areas be suitable for golden-cheeked warbler habitat, then operation at the CPNPP site may affect golden-cheeked warblers. The potential for significant adverse effects is not discountable. Therefore, the review team concludes that development and operation of project facilities may affect, and is likely to adversely affect the golden-cheeked warblers.

7.2 Whitney power transmission line

Black-capped vireo and Golden-cheeked warblers

If known locations of black capped vireo and golden-cheeked warblers, including Dinosaur Valley State Park, are avoided with sufficient buffer, then development and operation of the transmission line would not affect these species. If known breeding habitat cannot be avoided, then these species may be adversely affected. Because the potential for signficiant adverse effects is not discountable based on information available to the review team, the review team concludes that the project may affect, and is likely to adversely affect, the black-capped vireo and the golden-cheeked warbler.

7.3 Summary

Table 3 summarizes the review team's conclusions.

Table 3. Summary and Conclusions

	Black-capped vireo	Golden-cheeked warbler
CPNPP Site	No effect	May affect, is likely adversely affect
DeCordova line and pipeline	No effect	No effect
Whitney line	May affect, is likely to adversely affect	May affect, is likely to adversely affect

8.0 References

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy,* Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy,* Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 52. Code of Federal Regulations, Title 10. *Energy,* Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."

50 CFR Part 17. Code of Federal Regulations, Title 50, *Wildlife and Fisheries*, Part 17, "Endangered and Threatened Wildlife and Plants."

52 FR 37420. October 6, 1987. Endangered and Threatened Wildlife and Plants; Determination of the Black-capped Vireo TO BE an Endangered Species." *Federal Register*.

55 FR 53153. December 27, 1990. "Endangered and Threatened Wildlife and Plants; Final Rule to List the Golden-cheeked Warbler as Endangered." *Federal Register*.

71 FR 20714. April 21, 2006. "Endangered and Threatened Wildlife and Plants; 5-Year Review of 25 Southwestern Species." *Federal Register*.

72 FR 57416. October 9, 2007. "Limited Work Authorizations for Nuclear Power Plants." *Federal Register*. U.S. Nuclear Regulatory Commission.

Alonso, R., A. Bytnerowicz, J.L. Yee, and W.I. Boarman. 2005. Atmospheric Dry Deposition in the Vicinity of the Salton Sea, California—II: Measurement and Effects of an Enhanced Evaporation System". *Atmospheric Environment* 39: 4681–4689.

Campbell, L. 2003. *Endangered and Threatened Animals of Texa*s. Texas Parks and Wildlife: Wildlife Division Publication: PWD BK W7000-013.

Clean Water Act. (Federal Water Pollution Control Act). 33 USC 1251, et seq.

Edwards, Sean. 2009. E-mail from Sean Edwards USFWS to Michael Willingham USNRC titled Comanche Peak comments. February 19, 2009.

Enercon. 2009. *Wetland and Other Potentially Jurisdictional Waterbody Identification and Delineation*. Comanche Peak Nuclear Power Plant. No. TXUT-001-PR-015.

Engels, T.M., and C.W. Sexton. 1994. "Negative Correlation of Blue Jays and Golden-Cheeked Warblers near an Urbanizing Area." *Conservation Biology* 8(1):286–290.

Graber, J.W. 1961. "Distribution, Habitat Requirements, and Life History of the Black-Capped Vireo (*Vireo atricapillus*)." *Ecological Monographs* 31(4):313–336.

Griffith, Bryce et al. 2004. *Ecoregions of Texas* (color poster with map, descriptive text, and photographs) Reston, Virginia, U.S. Geological Survey (map scale 1:2,500,000).

Grzybowski, J.A. 1995. Black-Capped Vireo (*Vireo atricapillus*)." *The Birds of North America Online*, No. 181 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C. Accessed January 15, 2010, at http://bna.birds.cornell.edu/BNA.

Karl, Thomas R., Jerry M. Melillo, and Thomas C. Peterson (eds.). 2009. *Global Climate Change Impacts in the United States.* Cambridge University Press, New York. Accession No. ML100580077.

Kroll, J.C. 1980. "Habitat Requirements of the Golden-Cheeked Warbler: Management Implications." *Journal of Range Management* 33(1):60–65.

Ladd, C. and L. Gass. 1999. "Golden-Cheeked Warbler (*Dendroica chrysoparia*)." *The Birds of North America Online*, No. 420 (A. Poole and F. Gill, eds.). The Birds of North America, Inc. Philadelphia, PA. Accessed March 19, 2007, at http://bna.birds.cornell.edu/BNA.

Luminant Generation Company (Luminant). 2009a. *Comanche Peak Nuclear Power Plant Units 3 and 4, COL Application; Part 3, Environmental Report* (Rev. 1). Luminant Power Generation Company LLC, Glen Rose, Texas, November 20. Accession No. ML100081557.

Luminant Generation Company (Luminant). 2009b. Letter from R. Flores, Luminant Generation Company LLC, to U.S. Nuclear Regulatory Commission, Washington, D.C., "Comanche Peak, Units 3 and 4, Supplemental Information in Response to the Request for Additional Information Regarding the Environmental Review," Docket Nos. 52-034 and 52-035, Luminant Ref No. TXNB-09087, December 18. Accession No. ML093620032.

Luminant Generation Company (Luminant). 2010a. Letter from R. Flores, Luminant Generation Company LLC, to U.S. Nuclear Regulatory Commission, Washington, D.C., "Comanche Peak Nuclear Power Plant Units 3 and 4, Docket Nos. 52-034 and 52-035, Responses to Environmental Review Questions ALT-03 and SOC-33 and Supplemental Information for Question TE-04." Luminant Reference No. TXNB-10021, March 5. Accession No. ML100710613.

Luminant Generation Company (Luminant). 2010b. Letter from R. Flores, Luminant Generation Company LLC, to U.S. Nuclear Regulatory Commission, Washington, D.C., "Comanche Peak Nuclear Power Plant Units 3 and 4, Docket Nos. 52-034 and 52-035, Supplemental Information for Environmental Review Requests for Additional Information GEN-03 and GEN-07," Luminant Ref No. TXNB-10023, March 19. Accession No. ML100820402.

Luminant Generation Company (Luminant). 2010c. Letter from R. Flores, Luminant Generation Company LLC, to U.S. Nuclear Regulatory Commission, Washington, D.C., "Comanche Peak, Units 3 and 4, Response to the Request for Additional Information Regarding the Environmental Review and Supplemental Information for Previous Environmental Questions," Docket Nos. 52-034 and 52-035, Luminant Ref No. TXNB-10013, February 24. Accession No. ML100630660.

PBS&J. 2007. *Golden-Cheeked Warbler Bird Survey Report (for) TXU Power, Comanche Peak Power Plant, Somervell County, Texas.* Prepared for TXU Power, 1601 Bryan Street, Dallas, Texas 75201 by PBS&J, 18383 Preston Road, Suite 110, Dallas, Texas 75252. May.

PBS&J. 2008. *Golden-Cheeked Warbler Bird Survey Report (for) Luminant Power, Comanche Peak Power Plant, Somervell County, Texas.* Prepared for Luminant Power, 1601 Bryan Street, Dallas, Texas 75201 by PBS&J, 18383 Preston Road, Suite 110, Dallas, Texas 75252. May.

Pulich W.M. 1976. *The Golden-Cheeked Warbler, a Bio-Ecological Study.* Texas Parks and Wildlife Department, Austin, Texas. 172 pp. in 55 FR 53153.

Quarles, H.D. 2010. *Calculations Concerning Salt Drift Potential from CPNPP BDTF Evaporation Ponds.* Oak Ridge National Laboratory, Oak Ridge, Tennessee. May 2010.

Rivers and Harbors Appropriation Act of 1899, as amended. 33 USC 403, et seq.

Texas Parks and Wildlife Department (TPWD). 2007. *Cross Timbers and Prairies Ecological Region*. Accessed January 15, 2010, at http://www.tpwd.state.tx.us/landwater/land/habitats/cross_timbers/ecoregions/cross_timbers.phtml.

Texas Parks and Wildlife Department (TPWD). 2009. Letter from C. Smith, Executive Director Texas Parks and Wildlife, Austin, TX, concerning Comanche Peak Nuclear Power Plant Units 3 and 4 Combined License Application, to M. Lesar, NRC, Washington, D.C. February 16, 2009.

Texas State Data Center. (TSDC). 2009. *2008 Population Projections—Texas Counties*. Population Estimates and Projections Program, Texas State Data Center, Office of the State Demographer, Institute for Demographic and Socioeconomic Research, The University of Texas at San Antonio. February. Accessed May 29, 2009, at http://txsdc.utsa.edu/tpepp/2008projections/2008_txpopprj_cntytotnum.php.

Turbomist. 2010. Setup Variables—Salt Drift and Netting Waste Water Evaporation Treatment Water Mister System. Accessed February 8, 2010, at http://www.turbomister.com/setup/salt-drift-netting.php.

U.S. Endangered Species Act (ESA). 16 USC 1531 et seq.

U.S. Fish and Wildlife Service (USFWS). 1991. *Black-Capped Vireo (Vireo atricapillus) Recovery Plan*.

U.S. Fish and Wildlife Service (USFWS). 1992. *Golden-Cheeked Warbler (Dendroica chrysoparia) Recovery Plan*.

U.S. Fish and Wildlife Service (USFWS). 2007. *Black-Capped Vireo (Vireo atricapillus) 5-Year Review: Summary and Evaluation*. June 19, 2007.

U.S. Fish and Wildlife Service (USFWS). 2010. Ecological Services: Southwest Region. Accessed January 15, 2010, at http://www.fws.gov/southwest/es/EndangeredSpecies/lists/default.cfm.

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants,* NUREG-1437, Volumes 1 and 2, Washington, D.C., May. Accessed June 16, 2009, at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/.

U.S. Nuclear Regulatory Commission (NRC). 2000. *Standard Review Plans for Environmental Reviews for Nuclear Power Plants.* NUREG-1555, Volume . Washington, D.C.

Wermund, E.G. 1996. Physiographic map of Texas. Bureau of Economic Geology. The University of Texas at Austin. University Station. Box X. Austin, Texas, 78713.

Wahl, R.D., D. Diamond, and D. Shaw. 1990. *The Golden-Cheeked Warbler: A Status Review*. Prepared for U.S. Fish and Wildlife Service, Fort Worth, Texas. 63 pp. [In 55 FR 53153].

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Appendix G

Supporting Information and Data: Population Projections and Health Physics

Appendix G
Supporting Information and Data: Population Projections and Health Physics

G.1 Population Projections

Tables G-1 and G-2 provide population projections for 2007 followed by 10-year increments to 40 years beyond the estimated Comanche Peak Nuclear Power Plant (CPNPP) start-up date in 2016 (Luminant 2009a). Projections were derived from county estimates that were based on the cohort-component method (TSDC 2009). Population projections for the years 2007, 2016, 2026, 2036, 2046, and 2056 were estimated for each sector using the following methodology:

1. Using linear and polynomial regression, an equation was derived for each county. This equation was then used in conjunction with the 2000 county level census data to produce a county growth ratio set for each projected year.
2. Each set was then weighted by area into sectors and summed.
3. The 2000 Census block level data were then sorted into the radial grid, weighted by area, and summed.
4. The block level values for each sector were multiplied by their projection ratio, described in Step 1, to produce the final population sector tables (Tables G-1 and G-2) (Luminant 2009a, TSCD 2009).

Tables G-3 and G-4 provide transient population data that correspond by sector.

Table G-1. The projected permanent population for each sector 0–16 km (10 mi) for years 2007, 2016, 2026, 2036, 2046, and 2056

Direction / Year	Sector 0-2 (km)	2-4 (km)	4-6 (km)	6-8 (km)	8-10 (km)	10-16 (km)	0-16 (km)
NORTH							
2007	0	16	51	154	337	9395	9953
2016	0	18	59	179	390	10,884	11,530
2026	0	21	67	206	450	12,540	13,284
2036	0	24	76	233	509	14,195	15,037
2046	0	27	85	260	568	15,850	16,790
2056	0	29	94	287	628	17,506	18,544
NNE							
2007	1	18	39	113	220	6379	6770
2016	1	21	45	131	255	7391	7844
2026	1	24	52	151	293	8515	9036
2036	1	26	59	171	332	9639	10,228
2046	1	29	66	191	371	10,763	11,421
2056	1	32	73	210	409	11,887	12,612
NE							
2007	0	15	112	161	359	2296	2943
2016	0	17	130	186	416	2660	3409
2026	0	19	150	214	479	3065	3927
2036	0	21	170	243	542	3469	4445
2046	0	23	190	271	605	3874	4963
2056	0	25	209	299	668	4279	5480
ENE							
2007	0	2	36	84	271	2566	2959
2016	0	2	40	95	311	2970	3418
2026	0	3	45	108	355	3867	3929
2036	0	3	49	121	399	4315	4439
2046	0	3	54	133	443	4315	4948
2056	0	3	58	146	488	4763	5458
EAST							
2007	0	5	131	29	54	161	380
2016	0	6	145	32	60	177	420
2026	0	6	159	35	66	195	461
2036	0	7	174	39	72	213	505
2046	0	8	188	42	78	232	548
2056	0	8	203	45	84	250	590

Table G-1. (contd)

Direction / Year	Sector 0-2 (km)	2-4 (km)	4-6 (km)	6-8 (km)	8-10 (km)	10-16 (km)	0-16 (km)
ESE							
2007	0	23	57	111	247	495	933
2016	0	25	62	123	272	544	1026
2026	0	27	69	135	299	600	1131
2036	0	30	75	147	327	655	1234
2046	0	33	81	160	355	710	1339
2056	0	35	87	172	382	765	1442
SE							
2007	0	71	89	135	316	304	915
2016	0	79	98	148	348	335	1008
2026	0	87	108	163	383	369	1110
2036	0	95	117	178	419	403	1212
2046	0	102	127	193	454	437	1313
2056	0	110	137	208	489	471	1415
SSE							
2007	0	140	109	799	1516	598	3162
2016	0	154	120	879	1668	658	3479
2026	0	169	132	968	1837	725	3831
2036	0	185	144	1057	2006	791	4183
2046	0	200	156	1146	2175	858	4535
2056	0	216	168	1235	2344	925	4888
SSW							
2007	29	67	20	25	40	193	374
2016	32	74	22	27	44	213	412
2026	35	81	25	30	48	234	453
2036	38	89	27	33	52	256	495
2046	41	96	29	36	57	277	536
2056	44	104	32	38	61	299	578
SW							
2007	28	51	31	44	42	92	288
2016	31	56	35	48	46	101	317
2026	34	62	38	53	51	112	350
2036	37	68	42	58	55	122	382
2046	40	73	45	63	60	132	413
2056	43	79	49	67	65	143	446

Table G-1. (contd)

Direction / Year	Sector 0-2 (km)	2-4 (km)	4-6 (km)	6-8 (km)	8-10 (km)	10-16 (km)	0-16 (km)
WSW							
2007	39	31	40	23	44	73	250
2016	43	34	45	26	50	83	281
2026	47	37	50	29	56	94	313
2036	52	41	54	32	62	105	346
2046	56	44	59	36	69	115	379
2056	61	48	64	39	75	126	413
WEST							
2007	12	12	49	101	45	119	338
2016	14	14	57	117	52	138	392
2026	15	16	65	135	60	159	450
2036	16	17	74	153	68	180	508
2046	18	19	83	170	76	201	567
2056	19	21	91	188	83	222	624
WNW							
2007	1	5	22	68	77	216	389
2016	1	6	26	79	89	250	451
2026	1	7	29	91	102	288	518
2036	1	8	33	103	116	326	587
2046	1	9	37	115	130	364	656
2056	1	10	41	127	143	402	724
NW							
2007	1	2	6	4	27	985	1025
2016	1	3	7	4	32	1141	1188
2026	1	3	8	5	37	1315	1369
2036	1	4	9	5	41	1488	1548
2046	1	4	10	6	46	1662	1729
2056	1	4	11	7	51	1835	1909
NNW							
2007	1	4	16	63	169	851	1103
2016	1	4	18	73	196	986	1277
2026	1	5	21	85	226	1136	1473
2036	1	6	24	96	256	1286	1668
2046	1	6	26	107	285	1436	1860
2056	1	7	29	118	315	1585	2054

Table G-1. (contd)

Direction / Year	Sector 0-2 (km)	2-4 (km)	4-6 (km)	6-8 (km)	8-10 (km)	10-16 (km)	0-16 (km)
Totals							
2007	119	542	832	2038	3832	25,088	32,451
2016	131	601	935	2283	4304	28,932	37,186
2026	143	665	1047	2558	4825	33,207	42,445
2036	156	730	1159	2832	5347	37,478	47,702
2046	169	791	1271	3106	5870	41,749	52,956
2056	182	855	1384	3377	6391	46,022	58,211
Cumulative Totals	0-2 (km)	0-4 (km)	0-6 (km)	0-8 (km)	0-10 (km)	0-16 (km)	
2007	119	661	1493	3531	7363	32,451	
2016	131	732	1667	3950	8254	37,186	
2026	143	808	1855	4413	9238	42,445	
2036	156	886	2045	4877	10,224	47,702	
2046	169	960	2231	5337	11,207	52,956	
2056	182	1037	2421	5798	12,189	58,211	

Source: Luminant 2009a, TSCD 2009

Table G-2. The projected permanent population for each sector 16 km (10 mi)–80 km (50 mi) for years 2007, 2016, 2026, 2036, 2046, and 2056

Direction / Year	Sector 16-40 (km)	40-60 (km)	60-80 (km)	16-80 (km)
NORTH				
2007	11,320	37,256	17,904	66,480
2016	13,082	42,981	20,702	76,765
2026	15,040	49,342	23,811	88,193
2036	16,997	55,702	26,920	99,619
2046	18,955	62,063	30,028	111,046
2056	20,913	68,424	33,137	122,474
NNE				
2007	7586	61,636	91,401	160,623
2016	8777	70,856	104,610	184,243
2026	10,099	81,100	119,287	210,486
2036	11,422	91,345	133,964	236,731
2046	12,745	101,589	148,641	262,975
2056	14,067	111,834	163,318	289,219

Table G-2. (contd)

Direction / Year		Sector 16-40 (km)	40-60 (km)	60-80 (km)	16-80 (km)
NE					
	2007	5896	207,161	646,328	859,385
	2016	6963	237,503	736,399	980,865
	2026	8149	271,217	836,478	1,115,844
	2036	9335	304,930	936,557	1,250,822
	2046	10,521	338,644	1,036,636	1,385,801
	2056	11,707	372,358	1,136,715	1,520,780
ENE					
	2007	11,865	69,338	142,365	223,568
	2016	14,123	82,491	167,494	264,108
	2026	16,632	97,106	195,416	309,154
	2036	19,141	111,721	223,337	354,199
	2046	21,650	126,336	251,259	399,245
	2056	24,160	140,950	279,180	444,290
EAST					
	2007	27,428	15,290	9326	52,044
	2016	32,648	18,041	11,060	61,749
	2026	38,447	21,097	12,987	72,531
	2036	44,246	24,154	14,914	83,314
	2046	50,045	27,211	16,840	94,096
	2056	55,845	30,267	18,767	104,879
ESE					
	2007	975	3951	13,732	18,658
	2016	1129	4398	15,293	20,820
	2026	1301	4894	17,026	23,221
	2036	1472	5391	18,760	25,623
	2046	1644	5888	20,493	28,025
	2056	1815	6384	22,227	30,426
SE					
	2007	1154	8043	6691	15,788
	2016	1249	8816	7258	17,323
	2026	1355	9676	7999	19,030
	2036	1461	10,535	8740	20,736
	2046	1566	11,394	9481	22,441
	2056	1672	12,254	10,222	24,148

Table G-2. (contd)

Direction / Year		Sector 16-40 (km)	40-60 (km)	60-80 (km)	16-80 (km)
SSE					
	2007	1061	2866	7218	11,145
	2016	1145	3092	7792	12,029
	2026	1238	3342	8430	13,010
	2036	1331	3593	9069	13,993
	2046	1424	3844	9707	14,975
	2056	1517	4094	10,345	15,956
SOUTH					
	2007	1673	933	2547	5153
	2016	1808	1000	2776	5584
	2026	1958	1074	3022	6054
	2036	2108	1147	3262	6517
	2046	2258	1220	3493	6971
	2056	2408	1291	3718	7417
SSW					
	2007	688	2050	4478	7216
	2016	748	2132	4639	7519
	2026	814	2211	4788	7813
	2036	880	2276	4906	8062
	2046	946	2329	4991	8266
	2056	1012	2368	5045	8425
SW					
	2007	1172	1360	1492	4024
	2016	1291	1471	1541	4303
	2026	1424	1590	1580	4594
	2036	1557	1706	1601	4864
	2046	1689	1819	1605	5113
	2056	1822	1927	1592	5341
WSW					
	2007	5206	21,732	5543	32,481
	2016	5738	23,951	5796	35,485
	2026	6329	26,417	6024	38,770
	2036	6919	28,883	6196	41,998
	2046	7510	31,348	6313	45,171
	2056	8101	33,814	6374	48,289

Table G-2. (contd)

Direction / Year		Sector 16-40 (km)	40-60 (km)	60-80 (km)	16-80 (km)
WEST					
	2007	1566	3388	996	5950
	2016	1728	3734	1035	6497
	2026	1908	4118	1068	7094
	2036	2087	4503	1090	7680
	2046	2267	4887	1100	8245
	2056	2447	5271	1100	8818
WNW					
	2007	1236	853	1777	3866
	2016	1374	936	1890	4200
	2026	1527	1027	2009	4563
	2036	1680	1118	2120	4918
	2046	1833	1210	2224	5267
	2056	1986	1301	2320	5607
NW					
	2007	1805	1949	1703	5457
	2016	2061	2104	1834	5999
	2026	2345	2277	1980	6602
	2036	2629	2449	2126	7204
	2046	2914	2622	2272	7808
	2056	3198	2794	2418	8410
NNW					
	2007	4307	7022	23,143	34,472
	2016	4979	8013	25,718	38,710
	2026	5726	9115	28,580	43,421
	2036	6474	10,216	31,441	48,131
	2046	7221	11,317	34,303	52,841
	2056	7969	12,419	37,165	57,553

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Table G-2. (contd)

Direction / Year		Sector 16-40 (km)	40-60 (km)	60-80 (km)	16-80 (km)
Totals					
	2007	84,938	444,828	976,544	1,506,310
	2016	98,843	511,519	1,115,837	1,726,199
	2026	111,292	585,603	1,270,485	1,970,380
	2036	129,739	659,669	1,425,003	2,214,411
	2046	145,188	733,721	1,579,386	2,458,295
	2056	160,639	807,750	1,733,643	2,702,032
Cumulative Totals		16-40 (km)	16-60 (km)	16-80 (km)	
	2007	84,938	529,766	1,506,310	
	2016	98,843	610,362	1,726,199	
	2026	114,292	699,895	1,970,380	
	2036	129,739	789,408	2,214,411	
	2046	145,188	878,909	2,458,295	
	2056	160,639	968,389	2,702,032	

Source: Luminant 2009a, TSCD 2009

2

1

Table G-3. The current residential and transient population for each sector 0–16 km (10 mi)

Direction (2007)	Sector 0-2 (km)	2-4 (km)	4-6 (km)	6-8 (km)	8-10 (km)	10-16 (km)	0-16 (km)
NORTH	0	16	51	154	337	39,034	39,592
NNE	1	18	39	113	220	6439	6830
NE	0	15	112	161	359	2504	3151
ENE	0	2	36	84	271	2566	2959
EAST	0	5	131	29	54	161	380
ESE	0	23	57	111	247	495	933
SE	0	71	2989	2326	879	373	6638
SSE	0	140	109	799	3238	598	4884
SOUTH	8	80	24	377	68	665	1222
SSW	29	67	726	25	40	193	1080
SW	28	51	31	44	42	92	288
WSW	69	31	40	23	44	73	280
WEST	12	12	49	101	45	119	338
WNW	1	5	22	68	77	216	389
NW	1	2	6	4	27	1154	1194
NNW	0	4	16	63	169	851	1103
Totals	149	542	4438	4482	6117	55,533	71,261

Cumulative Totals	0-2 (km)	0-4 (km)	0-6 (km)	0-8 (km)	0-10 (km)	0-16 (km)
2007	149	691	5129	9611	15,728	71,261

Source: Luminant 2009a

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3

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Table G-4. The projected transient population for each sector 0–80 km (50 mi) for years 2007, 2016, 2026, 2036, 2046, and 2056

Distance (km)	Direction	2007	2016	2026	2036	2046	2056
2	WSW	30	33	36	39	42	46
6	SE	2900	3191	2514	3837	4160	4483
6	SSW	706	776	855	934	1012	1091
8	SE	2191	2411	2655	2899	3143	3387
8	S	253	278	307	335	363	391
10	SE	563	620	682	745	808	871
10	SSE	1722	1895	2087	2279	2471	2663
16	N	29,639	34,339	39,561	44,784	50,006	55,228
16	NNE	60	69	80	90	101	111
16	NE	208	242	278	315	352	388
16	SE	69	76	84	91	99	107
16	S	300	330	364	397	431	464
16	NW	169	196	226	255	285	315
40	N	136	157	180	204	227	251
40	NNE	107	124	143	162	181	199
40	NE	80	95	111	127	144	160
40	E	11,634	13,848	16,308	18,768	21,228	23,687
40	SSW	270	294	320	346	372	398
40	SW	1	1	1	1	2	2
40	WSW	5580	6150	6783	7416	8050	8683
40	NW	22	26	29	33	36	40
40	NNW	6	7	8	9	9	10
60	N	45,423	52,403	60,158	67,913	75,668	83,423
60	NNE	92	106	122	137	152	168
60	NE	2215	2539	2899	3260	3620	3981
60	ENE	5680	6757	7955	9152	10349	11,546
60	SE	11,135	12,205	13,395	14,585	15,775	16,964
60	SSE	715	771	834	896	959	1022
80	N	114	131	151	171	191	210
80	NNE	898	1028	1172	1316	1460	1604
80	NE	210,974	240,374	273,042	305,710	338,377	371,045
80	SSE	5321	5744	6215	6685	7155	7626
80	SSW	1750	1813	1871	1917	1950	1971
80	NNW	11,256	12,508	13,900	15,292	16,684	18,075

Source: Luminant 2009a, TSCD 2009

G.2 Supporting Documentation on Radiological Dose Assessment

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed and performed an independent dose assessment of the radiological impacts from normal operation of the new and existing nuclear units at the Comanche Peak Nuclear Power Plant site. The results of the assessment are presented in this appendix and are compared with the results from Luminant's assessment found in the Environmental Report (ER), Section 4.5, Radiation Exposure to Construction workers, and 5.4, Radiological Impacts of Normal Operation (Luminant 2009a, 2010). The appendix is divided into four sections: (1) dose estimates to the public from liquid effluents; (2) dose estimates to the public from gaseous effluents; (3) cumulative dose estimates; and (4) dose estimates to the biota from gaseous and liquid effluents.

G.2.1 Dose Estimates to the Public from Liquid Effluents

The NRC staff used the dose assessment approach specified in Regulatory Guide 1.109 (NRC 1977) and the LADTAP II computer code (Strenge et al. 1986) to estimate doses to the maximally exposed individual (MEI) and population within 50 mi from the liquid effluent pathway of the proposed Units 3 and 4. The NRC staff used the projected radioactive effluents release values from the Final Safety Analysis Report (Luminant 2009b). The GASPAR II computer code (Strenge et al. 1987) was used to estimate doses to the MEI and population from liquid effluent diverted to an evaporation pond during the course of operations of the proposed Units 3 and 4.

G.2.1.1 Scope

The NRC Staff and Luminant calculated the dose to the MEI assuming recreational use of Squaw Creek Reservoir (SCR). Pathways included were the ingestion of fish caught in SCR and external exposure to contaminated sediments deposited along the shoreline and to waterborne radionuclides while boating on SCR. Water downstream of SCR is not used as either drinking water or for irrigation. Access to SCR for recreational activity (boating, fishing and shoreline activity) is controlled by Luminant. Population doses were calculated for the same pathways as were used for the MEI dose evaluation.

The NRC staff reviewed the assumed exposure pathways and the input parameters and values used by Luminant for appropriateness. Default values from Regulatory Guide 1.109 (NRC 1977) were used when site-specific input parameters were not available. The NRC staff concluded that the assumed exposure pathways were appropriate – ingestion of fish and external exposure associated with recreational activities on SCR. The NRC staff also concluded that the input parameters and values used by Luminant were appropriate.

G.2.1.2 Resources Used

To calculate doses to the public from liquid effluents, the NRC staff used a personal computer version of the LADTAP II code and GASPAR II code entitled, NRCDOSE Version 2.3.15, (Chesapeake Nuclear Services, Inc. 2007) obtained through the Oak Ridge Radiation Safety Information Computational Center (RSICC).

G.2.1.3 Input Parameters

Tables G-5 lists the major parameters used in calculating dose to the public from liquid effluent releases during normal operation. Luminant (2009a) projected the 50 mi population to the year 2058. Section 5.4-1 of the Environmental Standard Review Plan (ESRP) (NRC 2000) suggests that the population be projected only five years out from the date of licensing action under

consideration. However, the projected population for 2058 is larger than the projected population for the time suggested by the ESRP; therefore, use of the 2058 population provides a bounding dose estimate.

G.2.1.4 Comparison of Results

NRC staff's dose calculations confirmed the doses estimated by Luminant.

G.2.2 Dose Estimates to the Public from Gaseous Effluents

The NRC staff used the dose assessment approach specified in Regulatory Guide 1.109 (NRC 1977) and the GASPAR II computer code (Strenge et al. 1987) to estimate doses to the MEI and to the population within 50 mi of the Comanche Peak site from the gaseous effluent pathway for both the proposed units. The NRC staff used the projected radioactive gaseous effluents release values from the Final Safety Analysis Report (Luminant 2009a).

G.2.2.1 Scope

The NRC staff and Luminant calculated the MEI dose at 0.79 mi south-southwest (SSW) of the new units. Pathways included were plume, ground, inhalation, and ingestion of locally grown meat and vegetables. Although no milk animals were reported within 5 mi of the site , ingestion of milk from a cow was also considered at this location (0.79 mi SSW) for completeness; milk animals could be introduced to the 5-mi area around the site in the future.

The NRC staff reviewed the parameters and values used by Luminant (2009a) for appropriateness. Default values from Regulatory Guide 1.109 (NRC 1977) were used when site-specific input parameters were not available. The NRC staff concluded that the assumed exposure pathways and input parameters were appropriate. These pathways and parameters were used by the NRC staff in its independent calculations using GASPAR II.

Joint frequency distribution data of wind speed and wind direction by atmospheric stability class for the Comanche Peak site provided in ER Table 2.7-105 (Luminant 2009a) were used as input to the XOQDOQ code (Sagendorf et al. 1982) to calculate average χ/Q and D/Q values for routine releases. The NRC staff reviewed the XOQDOQ output files provided by Luminant and concluded they are appropriate for use in dose calculations for the gaseous effluents.

Population doses were calculated for all types of releases (i.e., noble gases, particulates, iodines, H-3 and C-14) using the GASPAR II code for the following: plume immersion; direct radiation from radionuclides deposited on the ground, inhalation; and ingestion of vegetables, milk, and meat. As noted in Section 5.9.2.2, milk consumption was included based on an earlier land-use census.

G.2.2.2 Resources Used

To calculate doses to the public from gaseous effluents, the NRC staff used a personal computer version of the XOQDOQ and GASPAR II codes entitled, NRCDOSE Version 2.3.15, (Chesapeake Nuclear Services, Inc. 2007) obtained through the Oak Ridge RSICC.

G.2.2.3 Input Parameters

Tables G-6 provides a listing of the major parameters used in calculating dose to the public from gaseous effluent releases during normal operation.

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Table G-5. Parameters Used in Calculating Dose to the Public from Liquid Effluent Releases

	Annual Release (Ci)			Annual Release (Ci)	
Nuclide[(a)]	Liquid	Evaporation Pond	Nuclide[(a)]	Liquid	Evaporation Pond
H-3	1.60E+03	8.0E+02	Na-24	4.70E-03	2.35E-03
Cr-51	1.30E-03	6.50E-04	Mn-54	7.00E-03	3.50E-04
Fe-55	5.00E-04	2.50E-04	Fe-59	1.00E-04	5.00E-05
Co-58	1.90E-03	9.50E-04	Zn-65	2.20E-04	1.10E-04
Rb-88	2.80E-02	1.40E-02	Sr-89	6.00E-05	3.00E-05
Sr-90	8.00E-06	4.00E-06	Sr-91	6.80E-05	3.40E-05
Y-91m	4.40E-05	2.20E-05	Y-91	1.00E-05	5.00E-06
Y-93	2.90E-04	1.45E-04	Zr-95	2.00E-04	1.00E-04
Nb-95	1.00E-04	5.00E-05	Mo-99	1.64E-03	8.20E-04
Tc-99m	1.70E-03	8.50E-04	Ru-103	3.11E-03	1.56E-03
Ru-106	3.81E-02	1.91E-02	Ag-110m	6.00E-04	3.00E-04
Te-129m	7.80E-05	3.90E-05	Te-129	3.10E-04	1.55E-04
Te-131m	2.50E-04	1.25E-04	Te-131	7.60E-05	3.80E-05
Te-132	4.70E-04	2.35E-04	I-131	4.00E-04	2.00E-04
I-132	3.10E-04	1.55E-04	I-133	8.10E-04	4.05E-04
I-134	8.90E-05	4.45E-05	I-135	7.80E-04	3.90E-04
Cs-134	1.00E-03	5.00E-04	Cs-136	2.16E-02	1.08E-02
Cs-137	2.00E-03	1.00E-03	Ba-140	4.89E-03	2.45E-03
La-140	8.00E-03	4.00E-03	Ce-141	6.00E-05	3.00E-05
Ce-143	5.00E-04	2.50E-04	Ce-144	1.70E-03	8.50E-04
Pr-143	7.90E-05	3.95E-05	Pr-144	1.70E-03	8.50E-04
W-187	3.50E-04	1.25E-04	Np-239	5.30E-04	2.65E-04

(a) Only radionuclides included in Regulatory Guide 1.109 (NRC 1977) are considered.

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Table G-5. (contd)

Parameter	Staff Value	Comments
Discharge flow rate	248500 gal/min 553.7 ft^3/s	Value from ER Table 5.4-1 (Luminant 2009a).
Source term multiplier	1	To convert single-unit source term to two units.
Site type	Fresh water	Discharge to freshwater SCR
Re-concentration model	Completely mixed impoundment model	Value from ER Table 5.4-1 (Luminant 2009a).
Average effluent discharge rate from SCR	45.4 ft^3/sec	Value from ER Table 5.4-1 (Luminant 2009a).
Volume of SCR	6.3 x 10^9 ft^3	Value from ER Table 5.4-1 (Luminant 2009a)
Shore width factor (Squaw Creel	0.2	ER Table 5.4.-1 as suggested for river shoreline (NRC 1977)
Dilution factors for aquatic food and boating, shoreline and swimming, and drinking water (Squaw Creek)	1	ER Table 5.4-1; value of 1 indicates no dilution.
Transit time to location of maximum individual dose (hr)	7.3 hr	ER Table 5.4-1.
Consumption and usage factors for adults, teens, children, and infants	Shoreline usage (hr/yr) 12 (adult) 67 (teen) 14 (child) NA (infant) Boating exposure (hr/yr) 12 (adult) 67 (teen) 14 (child) NA (infant) Fish consumption (kg/yr) 21 (adult) 16 (teen) 6.9 (child) NA (infant)	ER Table 5.4-2; values from Reg. Guide 1.1.09, Table E-5. Swimming exposure assumed to be the same as shoreline usage.
50-mile population	3,493,553	ER Table 5/4-1 (Luminant 2009a)
Annual fish harvest, Whitney Reservoir and Brazos River (kg/yr)	324,375 kg/yr	ER Table 5.4-1 (Luminant 2009a)

Table G-5. (contd)

Parameter	Staff Value	Comments
50-mi population usage of shoreline)	22,358,746 person-hr/yr	ER Table 5.4.1; based on Reg. Guide 1.109 exposure times, age group fractions and 50% of 50-mi population.
50-mi population swimming usage	22,358,746 person-hr/yr	ER Table 5.4.1; based on Reg. Guide 1.109 exposure times, age group fractions and 50% of 50-mi population.
50-mi population boating usage	22,358,746 person-hr/yr	ER Table 5.4.1; based on Reg. Guide 1.109 exposure times, age group fractions and 50% of 50-mi population.

Table G-6. Parameters Used in Calculating Dose to the Public from Gaseous Effluent Releases.

Nuclide	Annual Release (Ci)	Nuclide	Annual Release (Ci)
H-3	1.80E+02	C-14	7.30E+00
Ar-41	3.40E+01	Cr-51	6.10E-04
Mn-54	4.30E-04	Co-57	8.20E-06
Co-58	2.30E-02	Co-60	8.80E-03
Fe-59	7.90E-05	Kr-85	1.40E+03
Sr-89	3.00E-03	Sr-90	1.20E-03
Zr-95	1.00E-03	Nb-95	2.50E-03
Ru-103	8.00E-05	Ru-106	7.80E-05
Sb-125	6.10E-05	I-131	4.20E-03
I-133	6.40E-02	Xe-131m	2.60E+02
Xe-133m	2.00E+00	Xe-135m	4.00E+00
Xe-135	2.00E+00	Xe-137	4.00E+00
Xe-138	1.00E+00	Cs-134	2.30E-03
Cs-136	8.50E-05	Cs-137	3.60E-03
Ba-140	4.20E-04	Ce-141	4.20E-05

Source: ER Table 5.4-7 (Luminant 2009a).

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Table G-6. (contd)

Parameter	Staff Value	Comments
Wind speed and direction	ER Tables 2.7-58 and 2.7-71 (Luminant 2009a)	Site-specific data for 5-yr period 2001-2006
Atmospheric dispersion coefficients	ER Tables 2.7-122 to 2.7-126 (Luminant 2009a)	Site-specific data
Ground deposition coefficient	ER Table 2.7-127 (Luminant 2009a)	Site-specific data
Annual milk production within 50-mi radius of site	9.08×10^8 L/yr	Site-specific data from ER Table 5.4-3 (Luminant 2009a)
Annual vegetable production within 50-mi radius of site	4.81×10^8 kg/yr	Site-specific data from ER Table 5.4-3 (Luminant 2009)
Annual meat production within 50-mi radius of site	4.26×10^7 kg/yr	Site-specific data from ER Table 5.4-3 (Luminant 2009a)
Receptor locations and Dispersion coefficients		Site specific values ER Table 5.55 (Luminant 2009a)

	Atmospheric Dispersion Coefficient χ/Q (s m^{-3})			
Receptor	Plain	Decayed	Decayed & depleted	D/Q (m^{-2})
EAB 0.37 mi NNW	5.5×10^{-6}	5.5×10^{-6}	5.1×10^{-6}	5.5×10^{-8}
Nearest residence 0.79 mi SSW Plant vents	4.4×10^{-7}	4.4×10^{-7}	3.9×10^{-7}	4.5×10^{-6}
Nearest residence 0.79 mi SSW Evaporation Pond	3.1×10^{-6}	3.1×10^{-6}	2.9×10^{-6}	2.1×10^{-8}
Swim Beach 0.79 mi SSW	8.3×10^{-7}	8.2×10^{-7}	7.3×10^{-7}	4.5×10^{-7}

Consumption factors:

	Consumption factors; ER Table 5.4-3 (Luminant 2009a)			
	Adult	Teen	Child	Infant
Milk (L/yr)	310	400	330	330
Meat (kg/yr)	110	65	41	-
Vegetables(kg/yr)				
Leafy	64	42	26	-
Other	520	639	520	-

Fraction of year leafy vegetables are grown	1.0	Site-specific value ER Table 5.403 (Luminant 2009a)
Fraction of year milk cows are on pasture	1.0	Site-specific value ER Table 5.403 (Luminant 2009a)
Fraction of MEI's vegetable intake from own garden	0.76	Site-specific value ER Table 5.403 (Luminant 2009a)

Table G-6. (contd)

Parameter	Staff Value	Comments
Fraction of year beef cattle on pasture	1.0	Site-specific value ER Table 5.403 (Luminant 2009a)

Values from ER Table 5.4-7 (Luminant 2009a)

G.2.2.4 Comparison of Doses to the MEI from Gaseous Effluent Releases

NRC staff's dose calculations confirmed the doses estimated by Luminant (2009a, 2010). In a revision of the ER, Luminant indicated that recreational activities will be allowed on SCR under its control. The NRC staff evaluated the dose to individuals using the "swim beach" location for such activities. The resulting doses are shown in Table G-7 and were found to be smaller than the MEI for gaseous effluent releases.

Table G-8, developed by NRC staff compares the combined dose estimates from direct radiation and gaseous and liquid effluents from existing Units 1 and 2 and the proposed Units 3 and 4 against the 40 CFR Part 190 standards. The NRC staff used the reported MEI dose values for the year 2008 operation of Units 1 and 2 (Luminant 2009b) in Table G-8 .

Table G-7. Annual Dose (mrem/yr) at Swim Beach[(a)] Due to Gaseous Effluent Releases

Receptor	Total Body	Thyroid	Skin
Adult	0.000014	0.000020	0.000014
Teen	0.000078	0.00012	0.000077
Child	0.000016	0.000028	0.000016
Infant[(b)]	0.000010	0.000020	0.000010

(a) Recreational activities involve exposure pathways of inhalation and external exposure to plume and ground.

(b) Infant's external exposure during recreational activities based on mother's exposure time.

Table G-8. Comparison of MEI Annual Doses (mrem/yr) with 40 CFR Part 190 Standards

	CPNPP Units 1 and 2[(a)]				CPNPP Units 3 and 4[(b)]				
	Liquid	Gaseous	Direct[(c)]	Total	Liquid	Gaseous	Total	Site Total	Regulatory Standard
Total Body	0.087	0.088	8.8	9.0	1.8	1.7	3.5	12	25
Thyroid	0.13	0.41	8.8	9.3	0.3	3.1	1.8	11	75
Other	<0.001	0.0028	8.8	8.8	2.6	5.1	7.7	17	25

(a) Liquid and gaseous dose values for Unit 1 and 2 operation in 2009 (Luminant 2009b).

(b) Derived from ER Table 5.4-12 (Luminant 2009a).

(c) Direct radiation values from ER Section 5.4.1.3 (Luminant 2009a).

G.2.3 Cumulative and Population Dose Estimates

Based on parameters shown for the liquid and gaseous pathways, Table G-5 and Table G-6, respectively, doses from the two proposed units were calculated for the MEI using LADTAP II and GASPAR II. The NRC staff's assessment of the MEI dose for Units 1 AND 2 is based on the doses reported for the MEI due to operations of Units 1 and 2 in 2008 (Luminant 2009b). The effluent releases during 2008 exceeded those in the preceding five years.

Based on parameters shown for the liquid and gaseous pathways, Table G-5 and Table G-6, respectively, doses were calculated using LADTAP II and GASPAR II to the population within 50 mi of the CPNPP site (as discussed in Section G.2.1.3 and G.2.2.3). Doses due to milk ingestion were determined based on the 2002 agricultural census except in counties where that census indicated no milk animals (cows or goats) were present; in these cases, data from the 1997 census were substituted. The dose estimated to the population within 50 mi of the CPNPP site from operations of proposed Units 3 and 4 is 8.0 person rem. It is noted that the 50-mi population was assumed to be for the year 2058; as discussed in Section G.2.1.3, this results in a bounding calculation of the dose compared to the ESRP methodology. For comparison, the annual background dose to the population within 50 mi from background radiation was estimated to be approximately 985,000 person-rem. This estimate is the product of the annual average dose to individuals from natural sources of 311 mrem, as stated in NCRP Report 160 (NCRP 2009), and the 2058 population of 3,490,000 persons.

G.2.4 Dose Estimates to the Biota from Liquid and Gaseous Effluents

The NRC staff performed confirmatory calculations of the doses to biota from liquid and gaseous effluents using the LADTAP II and GASPAR II. The NRC staff used a personal computer version of the LADTAP II code and GASPAR II code entitled, NRCDOSE Version 2.3.15, (Chesapeake Nuclear Services, Inc. 2007) obtained through the Oak Ridge Radiation Safety Information Computational Center (RSICC).

G.2.4.1 Liquid Effluent Pathways

The NRC estimated doses to biota from liquid effluents using fish, invertebrates, and algae as surrogate aquatic biota species. Muskrats, raccoons, herons, and ducks are used as surrogate terrestrial biota species. The NRC staff recognizes the LADTAP II computer program as an appropriate method for calculating dose to the aquatic biota and for calculating the liquid

pathway contribution to terrestrial biota. Most of the LADTAP II input parameters are specified in Section G.2.1.3; including the source term, the discharge flow rate to the receiving fresh water system, and the shore width factor. The NRC staff concluded these parameters were appropriate to use in calculating biota dose in the SCR. The NRC staff's dose analysis confirmed the liquid pathway doses to biota estimated by Luminant as shown in Table 5-13.

G.2.4.2 Gaseous Effluent Pathways

NRC staff assessed doses to terrestrial biota from the gaseous effluent pathway based on the results of the GASPAR II calculations for human doses discussed in Section G.2.2. Again, muskrats, raccoons, herons, and ducks are used as surrogate terrestrial biota species. The NRC staff assessed the doses at the exclusion area boundary (0.37 mi NNW) to achieve a reasonable estimate of the doses to terrestrial biota that might live on the CPNPP site. It was assumed that doses for raccoons and ducks were equivalent to adult human doses for inhalation, vegetation ingestion, and the plume. The dose from ground exposure was doubled. The doubling of doses from ground deposition reflects the closer proximity of these organisms to the ground. Muskrats and herons do not consume terrestrial vegetation, so that pathway was not included for these organisms. The NRC staff's dose assessment confirmed the gaseous pathway doses to biota estimated by Luminant as shown in Table 5-13.

G.4 References

40 CFR Part 190. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations."

Chesapeake Nuclear Services, Inc. 2007. *NRCDOSE for Windows*. Radiation Safety Information Computational Center, Oak Ridge, Tennessee.

Luminant Generation Company (Luminant). 2009a. *Comanche Peak Nuclear Power Plant Units 3 and 4, COL Application; Part 3, Environmental Report* (Rev. 1). Luminant Power Generation Company LLC, Glen Rose, Texas, November 20. Accession No. ML100081557.

Luminant Generation Company (Luminant). 2009b. *Comanche Peak Nuclear Power Plant 2008 Radioactive Effluent Release Report*, Luminant Generation Company LLC, Glen Rose, Texas, April 9. Accession No. ML091380039.

Luminant Generation Company (Luminant). 2010. *Comanche Peak Nuclear Power Plant Units 3 and 4, Docket Nos. 52-034 and 52-035, COL Application Part 3, Environmental Report, Update Tracking Report Revision 3*, Luminant Power Generation Company LLC, Glen Rose, Texas, March 3. Accession No. ML100640170.

National Council on Radiation Protection and Measurements (NCRP). 2009. *Ionizing Radiation Exposure of the Population of the United States*. NCRP Report No. 160, Bethesda, Maryland.

Sagendorf J.F., J.T. Goll, and W.F. Sandusky. 1982. XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations. NUREG/CR-2919, Pacific Northwest National Laboratory, Richland, Washington.

Strenge, D.L., R.A. Peloquin, and G. Whelan. 1986. LADTAP II—Technical Reference and User Guide. NUREG/CR-4013, Pacific Northwest Laboratory, Richland, Washington.

Strenge D.L., T.J. Bander, and J.K. Soldat. 1987. GASPAR II—Technical Reference and User Guide. NUREG/CR-4653, Pacific Northwest Laboratory, Richland, Washington.

Texas State Data Center. (TSDC). 2009. *2008 Population Projections—Texas Counties*. Population Estimates and Projections Program, Texas State Data Center, Office of the State

Demographer, Institute for Demographic and Socioeconomic Research, The University of Texas at San Antonio. February. Accessed May 29, 2009, at http://txsdc.utsa.edu/tpepp/2008projections/2008_txpopprj_cntytotnum.php.

U.S. Nuclear Regulatory Commission (NRC). 1977. 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. Regulatory Guide 1.109, Office of Nuclear Reactor Regulation, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2000. Standard Review Plans for Environmental Reviews for Nuclear Power Plants. NUREG-1555, Office of Nuclear Reactor Regulation, Washington, D.C. Accessed August 8, 2007, at http://www.nrc.gov/reading-rm/doc-collections/nuregs/ staff/sr1555/.

Appendix H

List of Authorizations, Permits, and Certifications

Appendix H

List of Authorizations, Permits, and Certifications

This appendix contains a list of the environmental-related authorizations, permits, and certifications potentially required by Federal, State, regional, local, and affected Native American tribal agencies related to the combined license for the Comanche Peak Nuclear Power Plant, Units 3 and 4. The table is has been modified from Table 1.2-1 of the Environmental Report submitted to the U.S. Nuclear Regulatory Commission by the applicant, Luminant Generation Company LLC (Luminant 2009a).

Reference

Luminant Generation Company LLC (Luminant). 2009a. *Comanche Peak Nuclear Power Plant Units 3 and 4, COL Application; Part 3, Environmental Report* (Rev. 1). Luminant Generation Company LLC, Glen Rose, Texas, November 20. Accession No. ML100081557.

Table H-1. Authorizations, Permits, and Certifications Required for Combined Licenses

Agency	Authority	Requirements	Activity Covered/Comments
U.S. Nuclear Regulatory Commission (NRC)	10 Code of Federal Regulations (10 CFR) Part 52	Applicant submits Construction and Operating License Application (COLA) to NRC	Applicant is required to submit an application to the NRC for a combined construction and operating license (COL).
NRC	10 CFR 52.79	Applicant submits an Environmental Report (ER)	Applicant is required to submit a complete ER, 10 CFR 52.80 (b), 72 FR 57447, Oct 9, 2007, 10 CFR 52.79, 10 CFR 51.45, 10 CFR 51.50.
U.S. Department of Energy (DOE)	Nuclear Waste Policy Act of 1982; Section 302(b)(B)	Applicant must have an agreement with the Department of Energy for the disposal of high-level waste and spent nuclear fuel	Contracts with DOE exist for disposal of spent nuclear fuel and/or high-level radioactive waste. (Contract No. DE-CR01-09RW09022 for CPNPP Unit 1; Contract No. DE-CR01-09RW09023 for CPNPP Unit 2)
U.S. Fish and Wildlife Service (USFWS) & Texas Parks and Wildlife Department (TPWD)		Consultation with Fish and Wildlife, Federal and State (FWS 2006)	Consultation concerning potential impacts to federally threatened and endangered species must be obtained and interference with any listed species must be resolved prior to disturbance.
Federal Aviation Administration (FAA) & Texas Department of Transportation (TDOT)	14 CFR 77.13	Notice of construction for permanent structures	Permit for structures over 200 ft in height (containment buildings, permanent facilities, cooling towers, etc.). Thirty days prior to construction of the obstruction.
FAA & TDOT	14 CFR 77.13	Notice of construction for temporary structures	Permit for structures over 200 ft in height (construction cranes, towers, etc.). Thirty days prior to construction of the obstruction.

Table H-1. (contd)

Agency	Authority	Requirements	Activity Covered/Comments
Texas Commission on Environmental Quality (TCEQ) & U.S. Environmental Protection Agency (EPA)	30 Texas Annotated Code (TAC) 335; EPA applies only to Units 1 and 2	Notice of Registration for solid waste management	Transport, treatment, storage, and disposal of solid waste. Notice requires modification 3 months prior to any new solid waste not previously described. (Solid Waste Reg. # 33306; EPA ID # TXD02332078)
U.S. Army Corps of Engineers (USACE) & TCEQ	Clean Water Act 404 Permit	Construction in a wetland or shoreline	Submit 24 months prior to dredging/filling activities in wetland if required. Depends on the 401 permit process.
EPA & TCEQ	Clean Water Act Section 401	Construction in a wetland or shoreline	Submit 24 months prior to dredging/filling activities in wetland if required.
TCEQ	Storm Water Pollution Prevention Plan (SWPPP); Texas Water Code Chapter 26	SWPPP for construction activities	Stormwater to surface water discharge associated with land disturbance and industrial activity during construction activities. Submit plan modification with Notice of Intent for a disturbance of 5 acres or more. (General Permit No. TXR 150000)
TCEQ	Notice of Intent (NOI); Texas Water Code Chapter 26 (SWPPP)	Pertains to General Permit relating to stormwater discharges from construction activities	Submit NOI 3 months prior to disturbance of land. (General Permit No. TXR 150000)
TCEQ	SWPPP; Texas Water Code Chapter 26	SWPPP for operations of facility	Submit plan modification concurrent with submittal of Stormwater Operations NOI. (Part III of General Permit No. TXR 050000)

Table H-1. (contd)

Agency	Authority	Requirements	Activity Covered/Comments
TCEQ	NOI; Texas Water Code Chapter 26	Pertains to General Permit relating to stormwater discharges from operation activities	Submit NOI 3 months prior to operations. (General Permit No. TXR 050000)
TCEQ	Texas Water Code Chapter 5 and 26 TPDES Industrial Wastewater Permit (Major Source Modification); Clean Water Act Section 402	Modification or additions to wastewater facilities	Certification and licensing of municipal and domestic wastewater facilities. Submit 18 months prior to new construction or modification. (TPDES # WQ0001854000; Must be renewed, but may require modification)
TCEQ	30 TAC 285	Submit on-site sewage treatment and design permit	Six months prior to construction.
Public Utilities Commission (PUC) of Texas		Certificate of Convenience and Need Application	Certification that present and future public convenience and necessity require or will require the operation of such equipment or facility and that it will be constructed and operated in compatibility with the environment.
State Historic Preservation Officer (SHPO); Native American Tribes	13 TAC 26; Archeological sites	Permission required prior to clearing of any lands	Identification and evaluation of historic properties and any cultural sites of significance to Native American tribes (site, transmission corridors, pipeline corridors).

Table H-1. (contd)

Agency	Authority	Requirements	Activity Covered/Comments
SHPO	Section 106 National Historic Preservation Act (NHPA); 36 CFR 800	Permission required prior to clearing of any lands	Review and analysis of cultural and historical resources, including completion of NHPA Section 106 consultation. SHPO concurrence supports no new study needed at CPNPP site.
Brazos River Authority (BRA)		Use of surface water approved by local water authority	New surface water rights secured from Lake Granbury for transfer to CPNPP site and return to Lake Granbury.
TPWD	31 TAC 69	Scientific Collection Permit	Sampling contractors need to have permit in hand for species collection. (Each Vendor maintains a permit for collection)
TCEQ	30 TAC 335	Landfill #6 Closure Plan	Plan to close landfill is needed 3 months prior to its being disturbed.
TCEQ	30 TAC 335	Landfill #6 Closure Certification Report	Report upon completion of excavation as to the results versus the plan.
TCEQ	30 TAC 116	Concrete batch plant air permit	Concrete batch plant air permit required 6 months prior to construction for operation of an on-site concrete plant.
TCEQ	30 TAC 122	Title V Operating Permit for diesel units	Diesel engines air permit for discharge to environment. Emergency diesels, fire pump diesels, auxiliary boilers, gas turbines, etc. Twelve months prior to initial firing of diesels. [TCEQ Air Permit No. 19225 (not Title V permit); Requires modification]
TCEQ	7 TAC 111	Air permit for burning debris in pit	After burn pit is constructed, the permit is required 3 months prior to any burn activities.

Table H-1. (contd)

Agency	Authority	Requirements	Activity Covered/Comments
EPA	40 CFR 110/112	Spill Prevention Control and Countermeasures Plan (SPCCP)	Revise existing plan 6 months prior to construction if changes are indicated.
EPA	40 CFR 110/112	SPCCP – Revision	A revision to the plan may be required if contractors store more than 1320 gallons of petroleum products.
TDOT; Hood and Somervell County agencies		Road construction, road crossings, interruption of traffic flow	Affected areas involving old or new roads – changes or interruption of traffic.
TCEQ	30 TAC 106	Rock crusher operations	For rock debris going to be crushed, obtain a permit 6 months prior to operation.
NRC		Appendix B - Facilities Operating License Environmental Protection Plan, non-radiological	Changes required in the Environmental Protection Plan, non-radiological, to be modified pending final design reviews, approvals, and prior to operation of the facility.
TCEQ	30 TAC 321.255; 30 TAC 210.23; 30 TAC 309	Evaporation pond liner and size requirements	Certify evaporation pond meets requirements prior to use.
TCEQ		Hazardous materials storage (SARA Title III)	
TCEQ		Toxic chemical release inventory reporting form	
TCEQ	Disposal Facility	Radiological waste disposal registration	

Table H-1. (contd)

Agency	Authority	Requirements	Activity Covered/Comments
PUC of Texas		PUC approval of decommissioning plan	
TCEQ	30 TAC 116	State construction air permit	

Appendix I

Severe Accident Mitigation Alternatives

Appendix I

Severe Accident Mitigation Alternatives

I.1 Introduction

Luminant has submitted an application to construct two U.S. Advanced Pressurized Water Reactors (US-APWR) at the Comanche Peak Nuclear Power Plant (CPNPP) site. Current policy developed after the Limerick decision (Limerick 1989) requires that the U.S. Nuclear Regulatory Commission (NRC) staff consider alternatives to mitigate the consequences of severe accidents in a site-specific environmental impact statement (EIS). The severe accident mitigation alternative (SAMA) review presented here considers both severe accident mitigation design alternatives (SAMDAs) and procedural alternatives.

In Title 10 of the Code of Federal Regulations (CFR), 10 CFR 52.79(a)(38), the NRC requires that applicants for combined licenses (COLs) include "… a description and analysis of design features for the prevention and mitigation of severe accidents…" The Final Safety Analysis Report (FSAR) (Luminant 2009b) and the Environmental Report (ER) (Luminant 2009a) in the Luminant COL application address these requirements.

In 10 CFR 52.47(a)(23), the NRC requires that applicants for design certification include "… a description and analysis of design features for the prevention and mitigation of severe accidents…" in the application for design certification. In 10 CFR 52.47(a)(27) the NRC requires a description of a "…plant-specific probabilistic risk assessment (PRA) and its results," and in 10 CFR 52.47(b)(2) the NRC requires an ER that contains the information required by 10 CFR 51.55. Mitsubishi Heavy Industries, Ltd. (MHI) has submitted all of this information in documents that are part of the application for certification of the US-APWR design.

While the NRC staff has not completed its generic SAMDA review of the US-APWR for design certification, the staff has conducted a review of the Luminant SAMDA analysis specific to operation of two US-APWRs at the CPNPP site (Luminant 2009a). The analysis is based on:

1. the PRA included as Section 19.1 of the Comanche Peak FSAR (Luminant 2009b) and the SAMDA analysis in the US-APWR ER (Luminant 2009a), and
2. results of the analysis of probability-weighted risks of US-APWR design at the CPNPP site described in Section 5.11.2 of this EIS.

An analysis for a US-APWR at a generic site is presented first; then the analysis is extended to include consideration of CPNPP site-specific information. The SAMDA analysis for the proposed US-APWR design certification will be finally resolved through the design certification rulemaking process.

I.2 US-APWR SAMDA Review – Generic Site

This section addresses the generic analysis of SAMDAs conducted by MHI, the applicant for certification of the US-APWR design. The SAMA review in Section I.3 extends the generic SAMDA analysis to include CPNPP site-specific factors including meteorology, population, and land use. Section I.3 also addresses SAMAs that were not included in the generic analysis because they do not involve reactor system design.

I.2.1 US-APWR PRA Results

MHI, the applicant for certification of the US-APWR design conducted Level 1 and Level 2 PRAs to estimate the core damage frequencies (CDFs) that might result from a large number of initiating events and accident sequences. Table I-1 lists these CDF estimates and estimates of the large release frequencies (LRFs) of iodine, cesium, or tellurium. Releases associated with containment bypass, containment isolation failure, or containment failure at or before reactor vessel failure are considered to be large. Table I-1 also lists NRC staff goals related to CDFs and LRFs.

Table I-1. Comparison of US-APWR PRA Results with the Design Goals

	NRC Design Goal[(a)]		US-APWR PRA Results[(b)]	
	Core Damage Frequency (yr^{-1})	**Large Release Frequency (yr^{-1})**	**Core Damage Frequency (yr^{-1})**	**Large Release Frequency (yr^{-1})**
Internal At Power Events	1.0×10^{-4}	1.0×10^{-6}	1.2×10^{-6}	1.0×10^{-7}
Internal Flooding Events	1.0×10^{-4}	1.0×10^{-6}	1.5×10^{-6}	4.0×10^{-7}
Internal Fire Events	1.0×10^{-4}	1.0×10^{-6}	1.7×10^{-6}	1.2×10^{-7}
Low Power and Shutdown Events	1.0×10^{-4}	1.0×10^{-6}	2.5×10^{-7}	$2..5 \times 10^{-7}$

(a) SECY-90-016 (NRC 1990a) and associated SRM (NRC 1990b)

(b) From Chapter 19 of the US-APWR (MHI 2009c)

Although the US-APWR PRAs did not provide quantitative estimates of CDFs and LRFs for seismic and other external initiating events such as hurricanes and tornadoes, they are discussed in the FSAR. The Section 19.1.5.1 of the FSAR (MHI 2009a) presents the results of a seismic margins analysis in which PRA methods are used to identify potential vulnerabilities in the design and so corrective measures can be taken to reduce risk. Similarly, FSAR Section 19.1.5 addresses risks associated with high winds and tornadoes, external flooding, transportation and nearby facility accidents and aircraft crash. Risks associated with these events are considered to be insignificant by MHI.

I.2.2 Potential Design Improvements

In the ER submitted as part of the design certification application (MHI 2009a), MHI identified 156 candidate alternatives based on a review of industry documents, including previous SAMDA reviews and NRC evaluations of those reviews, and consideration of plant-specific enhancements. The candidate alternatives were then screened to identify candidates for detailed evaluation. The categories use in screening were

- not applicable
- already implemented
- combined

- excessive implementation cost
- very low benefit

The development of the US-APWR design has benefitted from insights gained in numerous PRAs. The low CDFs and LRFs in Table I-1 are attributable to the implementation of design improvements already incorporated into the US-APWR design. The following are examples of the 22 candidate alternatives included in the design:

- install a gas turbine generator
- improve emergency core cooling system suction strainers
- provide an in-containment reactor water storage tank
- provide capability to remote, manual operation of secondary side pilot-operated relief valves in a station blackout
- provide a reactor coolant depressurization system
- provide hardware connections to allow another essential raw cooling water system to cool charging pump seals
- provide ability for emergency connection of existing or new water sources to feedwater and condensate systems
- provide a reactor cavity flooding system

The screening process eliminated 20 candidate alternatives as being inapplicable for the US-APWR design; 3 candidate alternatives were combined with similar alternatives; and 29 candidate alternatives were procedural or administrative rather than design alternatives. Of the remaining 82 candidate alternatives, 69 were categorized as very low benefit because it would not significantly reduce risk, and 3 were categorized as having excessive implementation costs. 10 candidate alternatives were identified for further evaluation. The 10 candidate SAMDAs are:

1. Provide additional direct current (dc) battery capacity (At least one train emergency dc power can be supplied more than 24 hours.)
2. Provide an additional diesel generator (At least one train emergency alternating current (ac) power can be supplied more than 24 hours.)
3. Install an additional, buried off-site power source
4. Provide an additional high pressure injection pump with independent diesel (With dedicated pump cooling)
5. Add a service water pump (Add independent train)
6. Install an independent reactor coolant pump seal injection system, with dedicated diesel (With dedicated pump cooling)
7. Install an additional component cooling water pump (Add independent train)
8. Add a motor-driven feedwater pump (With independent room cooling)
9. Install a filtered containment vent to remove decay heat
10. Install a redundant containment spray system (Add independent train)

I.2.3 Cost-Benefit Comparison

MHI used the cost-benefit methodology found in NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (NRC 1997), to calculate the maximum attainable benefit associated with completely eliminating all risk for the US-APWR.

This methodology involves determining the net value for a SAMDA according to the following formula:

Net Value = (APE + AOC + AOE + AOSC) - COE

Where

APE = present value of averted public exposure ($)

AOC = present value of averted offsite property damage costs ($)

AOE = present value of averted occupational exposure costs ($)

AOSC = present value of averted onsite costs ($); this includes cleanup, decontamination, and long-term replacement power costs

COE = cost of enhancement ($)

If the net value of a SAMDA is negative, the cost of implementing the SAMDA is larger than the benefit associated with the SAMDA and it is not considered to be cost beneficial.

To assess the risk reduction potential for SAMDAs, MHI (MHI 2009b) assumed that each design alternative would completely eliminate all severe accident risk. This assumption is conservative as it maximizes the benefit of each design alternative. The applicant estimated the public exposure benefits for the design alternative on the basis of the reduction of risk expressed in terms of whole body person-rem per year received by the total population within a 50-mi radius of the generic site hosting a US-APWR.

Table I-2 summarizes MHI's estimates of each of the associated cost elements. The provided results are based on the approach, parameters, and data listed in NUREG/BR-0184. Baseline risks used in the analysis were 3.0×10^{-1} person-rem Ryr^{-1} for population dose risk and \$706 $Ryr^{-1}$for cost risk for internal events during full-power operation (Luminant 2009a).

The monetary present value estimate for each risk attribute does not represent the expected reduction in risk resulting from a single accident; rather, it is the present value of a stream of potential losses extending over the projected lifetime of the facility (in this case projected to be 60 years). Therefore, the averted cost estimates reflect the expected annual loss resulting from a single accident, the possibility that such an accident could occur at any time over the licensed life, and the effect of discounting these potential future losses to present value.

Table I-2. **Summary of Estimated Maximum Averted Costs for a Generic Site**

Quantitative Attributes		Averted Cost Estimate ($) x 1000[(a)]	
		7% discount	3% discount
Health	Public (APE)	29.1	75.1
	Occupational (AOE)	2.3	5.9
Property	Offsite[(b)] (AOC)	0.5	1.3
	Onsite	NA[(c)]	NA[(c)]
Cleanup and Decontamination	Onsite (AOSC)[(d)]	69.8	180.2
Replacement Power	(AOSC)[(d)]	187.6	484.4k
Total		289.3	747.1

(a) From the design certification ER (MHI 2008).

(b) Includes offsite cleanup and decontamination costs.

(c) Not Analyzed.

(d) AOSC includes onsite cleanup and decontamination costs and the cost of replacement power.

(e) Based on internal event, internal flooding, and internal fire risks.

As indicated above, MHI estimated the total present dollar value equivalent associated with complete elimination of severe accidents at a single US-APWR unit site to range between about $289k and about $747k. The estimated cost of replacement power has the largest effect on the averted cost. For any SAMDA to be cost beneficial, the enhancement cost must be less than $747k. Based on a cost estimate of $289k, MHI concluded that none of the SAMDA candidates are cost beneficial. MHI states that older studies were used for cost examples of SAMDA candidates without attempting to adjust to present-day dollars with the exception of cost associated with procurement and installation, and where applicable, long-term maintenance, surveillance, calibration and training. In one case (Containment Spray System, SAMDA 10), the cost was scaled from a lower-power unit to the larger power (1610 Mwe) appropriate for the US-APWR. The cost of other SAMDA candidates was determined without power scaling (MHI 2008).

I.2.4 Staff Evaluation

In 10 CFR 52.47(a)(27), the NRC requires that an applicant for design certification perform a plant- or site-specific PRA. The aim of this PRA is to seek improvements in the reliability of core and containment heat removal systems that are significant and practical. The set of potential design improvements considered for the US-APWR include those from industry guidance, previous SAMDA review, and review of the US-APWR design. The US-APWR design already incorporates many design enhancements related to severe accident mitigation. Such design improvements have resulted in a CDF that is a factor of 3 of magnitude lower than the CDFs for the existing CPNPP Units 1 and 2.

MHI's averted cost estimates are based on point-estimate values, without consideration of uncertainties in CDF or offsite consequences. Even though this approach is consistent with that

used in previous design alternative evaluations, further consideration of these factors could lead to significantly higher risk reduction values, given the extremely small CDF and risk estimates in the baseline PRA. Uncertainties either in CDF or in offsite radiation exposures resulting from a core damage event are fairly large because key safety features of the US-APWR design are unique, and their reliability has been evaluated through analysis and testing programs rather than through operating experience.

Further, in evaluating the costs of SAMDA candidates, MHI did not explicitly assess the capital costs associated with the various alternatives. Instead, MHI used estimated costs of back fitting of similar SAMDAs provided by industry in license renewal applications. This approach has the potential to overestimate the actual costs of SAMDAs because the cost of implementing a modification to a reactor that has been built is always greater than implementing the modification in a design that is still evolving.

I.3 Comanche Peak Site-Specific SAMA Review

The discussion above evaluates SAMDAs for the US-APWR at a generic site. The discussion that follows updates that evaluation to include consideration of CPNPP site-specific factors including meteorological conditions, population distribution, and land use. It is based on the Luminant SAMDA analysis presented in the ER (Luminant 2009a). The last part of this discussion deals with procedural and training SAMAs.

I.3.1 Risk Estimates

Luminant estimated severe accident risks for a US-APWR at the CPNPP site in Section 7.2 of its ER (Luminant 2009a). The NRC staff evaluated the information for the US-APWR design supplied by MHI and Luminant (MHI 2009b; Luminant 2009) and CPNPP site-specific data (meteorology, demographics, and land use) provided by Luminant. The results of these analyses are found in Table 5-22, "Environmental Risks from a US APWR Severe Accident at the Comanche Peak Site," in Chapter 5 of this EIS.

Table 5-22, gives a CDF of 1.2×10^{-6} Ryr^{-1}, and population dose and cost risks of 0.3 person-rem Ryr^{-1} and \$714 Ryr^{-1}, respectively. These risks are based on internally initiated events. Table 5-23 [(Total Severe Accident Health Effects (based on 2006 Meteorological Data)] gives a CDF of 4.6×10^{-6} Ryr^{-1} when internal flooding events, internal fire events that occur while the reactor is at power, and low power and shutdown events are considered.

I.3.2 Cost-Benefit Comparison

In Section 7.3.2 of the ER (Luminant 2009a), Luminant estimates the averted costs associated with eliminating all severe accident risks associated for a US-APWR at the CPNPP site. The Luminant analysis is an update the MHI SAMDA analysis (MHI 2009b) to include site specific information. Luminant substituted population dose and offsite cost risks based on 2056 population projections for the CPNPP site for the population dose and offsite property costs in the MHI analysis. Table I-3 shows both the MHI generic averted cost estimates and the Luminant estimates.

Table I-3. Summary of Estimated Averted Costs for the Comanche Peak Site

Quantitative Attributes		Averted Cost Value Estimate ($) x 1000			
		MHI Generic[(a)]		Comanche PeakSite[(b)]	
		7% discount	3% discount	7% discount	3% discount
Health	Public (APE)	29.1	75.1	16.5	42.7
	Occupational (AOE)	2.3	5.9	2.3	6.0
Property	Offsite[(c)] (AOC)	0.5	1.3	28.0	72.4
	Onsite	NA[(d)]	NA[(d)]	NA[(d)]	NA[(d)]
Cleanup and Decontamination	Onsite (AOSC)[(e)]	69.8	180.2	70.5	182.0
Replacement Power	(AOSC)[(e)]	187.6	484.4	187	483.7
Total		**289.3**	**$747.1**	**304.6**	**786.7**

(a) From design certification ER (MHI 2009b)

(b) Luminant estimates (Luminant 2009a)

(c) Includes cleanup and decontamination costs

(d) Not analyzed

(e) AOSC includes onsite cleanup and decontamination cost and the cost of replacement power

In assessing the risk reduction potential of design improvements for the US-APWR, the NRC staff evaluated the MHI risk reduction estimates for the various design alternatives and assessed the potential impact of uncertainties on the results. The analyses in Table I-2 and Table I-3 present the value of reducing the severe accident risk to zero. These values are used in screening potential SAMDAs. Using the results in Table I-2, MHI concluded that no candidate alternative from an initial list of 156 alternatives would be cost beneficial. The CPNPP site-specific values, although higher than those estimated for a generic site, are below the minimum estimated cost for a design change. Moreover, no SAMDA can reduce the risk to zero. Therefore, the staff concludes that it is highly unlikely that any SAMDA would be cost beneficial at the CPNPP site.

I.3.3 Procedural and Training SAMAs

The original list of 156 US-APWR SAMDAs included 29 candidate alternatives that were procedural or training in nature. These items were eliminated from consideration because they did not involve design changes. Examples of items screened out for this reason include

- revise procedure to allow bypass of diesel generator trips
- develop procedures for replenishing diesel fuel oil
- emphasize steps in recovery of offsite power after a station blackout in training
- provide additional training on loss of component cooling water

- implement procedures to stagger high pressure safety injection pump use after a loss of service water
- proceduralize local manual operation of auxiliary feedwater system when control power is lost.

These candidate alternatives fall within the scope of the SAMA review that the NRC staff conducts as part of its environmental review of applications. However, such SAMAs generally involve procedures that have not been developed for a reactor that has not been built and that are typically not developed until construction has been completed and the plant is approaching operation.

The staff reviewed the candidate alternatives that were previously screened out because they did not involve design changes. Because the maximum attainable benefit is low, an SAMA based on procedures or training for a US-APWR at the CPNPP site would have to reduce the CDF or risk by approximately 20 percent to become cost beneficial. Based on the its evaluation, the staff concludes that none of these SAMAs would reduce the CDF or risk by 20 percent for a US-APWR at CPNPP. Therefore, they would not be likely to be cost effective if the procedures that are referenced actually existed.

Luminant has stated that evaluation of administrative SAMAs would not be appropriate until the plant design is complete and that the appropriate administrative controls on plant operations would be incorporated into the plant's managements systems as part of its baseline configuration (Luminant 2009b, Chapter 19). Based on this statement, the staff expects that Luminant will consider risk insights and mitigation measures in the development of procedures and training; however, this expectation is not crucial to the staff's conclusions because the staff already concluded procedural and training SAMAs would be unlikely to be cost effective.

I.4 Conclusions

Based on its evaluation of the US-APWR PRA (MHI 2009a) and SAMDA analysis (MHI 2009b), the CPNPP site-specific severe accident and SAMDA analyses (Luminant 2009a and Luminant 2009b) and its own independent review, the staff concludes that that there are no US-APWR SAMDAs that would be cost beneficial at the CPNPP site. The staff expects that Luminant will consider risk insights and mitigation measures in the development of procedures and training; however, this expectation is not crucial to the staff's conclusions because the staff concludes procedural and training SAMAs would be unlikely to be cost effective.

I.5 References

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."

Limerick Ecology Action v. NRC (Limerick). 1989. "Federal Reporter, Second Series, Vol 869, P 719 [3rd Circuit]."

Luminant Generation Company (Luminant). 2009a. *Comanche Peak Nuclear Power Plant Units 3 and 4, COL Application; Part 3, Environmental Report* (Rev. 1). Luminant Power Generation Company LLC, Glen Rose, Texas, November 20. Accession No. ML100081557.

Luminant Generation Company (Luminant). 2009b. *Comanche Peak Nuclear Power Plant, Units 3 and 4, COL Application; Part 2, Final Safety Analysis Report* (Rev. 1). Luminant Power Generation Company LLC, Glen Rose, Texas, November 2009. Accession No. ML100082110.

Mitsubishi Heavy Industries, Ltd (MHI). 2008. *US-APWR Applicant's Environmental Report—Standard Design Certification*. MUAP-DC021 Revision 1, August 2008.

Mitsubishi Heavy Industries, Ltd (MHI). 2009a. *Design Control Document for the US-APWR,* Chapter 19, Probabilistic Risk Assessment and Severe Accident Evaluation. MUAP-DC0019, Revision 2, October 2009.

Mitsubishi Heavy Industries, Ltd (MHI). 2009b. *US-APWR Applicant's Environmental Report—Standard Design Certification*. MUAP-DC021 Revision 2, October 2009.

U.S. Nuclear Regulatory Commission (NRC). 1990a. "Evolutionary Light Water Reactor Certification Issues and Their Relationship to Current Regulatory Requirements." SECY-90-016, January 1990.

U.S. Nuclear Regulatory Commission (NRC). 1990b. "SECY-90-16-Evolutionary Light Water Reactor Certification Issues and Their Relationships to Current Regulatory Requirements." Staff Requirements Memorandum, June 1990.

U.S. Nuclear Regulatory Commission (NRC). 1997. *Regulatory Analysis Technical Evaluation Handbook*. NUREG/BR-0184, NRC, Washington, D.C.

Appendix J

Carbon Dioxide Footprint Estimates for a 1000 MW(e) Light Water Reactor (LWR)

Appendix J

Carbon Dioxide Footprint Estimates for a 1000 MW(e) Light Water Reactor (LWR)

The review team has estimated the carbon dioxide (CO_2) footprint of various activities associated with nuclear power plants. These activities include building, operating, and decommissioning the plant. The estimates include direct emissions from the nuclear facility and indirect emissions from workforce transportation and the uranium fuel cycle.

Construction equipment estimates listed in Table J-1 are based on hours of equipment use estimated for a single nuclear power plant at a site requiring a moderate amount of terrain modification. Equipment usage for a multiple unit facility would be larger, but it is likely that it would not be a factor of 2 larger. A reasonable set of emissions factors used to convert the hours of equipment use to CO_2 emissions are based on carbon monoxide emissions (UniStar 2007) scaled to CO_2 using a scaling factor of 165 tons of CO_2 per ton of CO. This scaling factor is based on emissions factors in Table 3.3-1 of AP-42 (EPA 1995). Equipment emissions estimated for decommissioning are one half of those for construction.

Table J-1. Construction Equipment CO_2 Emissions (metric tons equivalent)

Equipment	Construction Total[(a)]	Decommissioning Total[(b)]
Earthwork and Dewatering	1.1×10^4	5.4×10^3
Batch Plant Operations	3.3×10^3	1.6×10^3
Concrete	4.0×10^3	2.0×10^3
Lifting and Rigging	5.4×10^3	2.7×10^3
Shop Fabrication	9.2×10^2	4.6×10^2
Warehouse Operations	1.4×10^3	6.8×10^2
Equipment Maintenance	9.6×10^3	4.8×10^3
TOTAL[(c)]	3.5×10^4	1.8×10^4

(a) Based on hours of equipment usage over 7-yr period.

(b) Based on equipment usage over 10-yr period.

(c) Total not equal to the sum due to rounding.

Workforce estimates are typical workforce numbers for new plant construction and operation based on estimates in various COL applications, and decommissioning workforce emissions estimates are based on decommissioning workforce estimates in NUREG-0586 S1, *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1 Regarding the Decommissioning of Nuclear Power Reactors* (NRC 2002). A typical construction workforce averages about 2500 for a 7-year period with a peak work force of about 4000. A typical operations workforce for the 40-year life of the plant is assumed to be about 400, and the decommissioning workforce during a decontamination and dismantling period of 10

years is assumed to be 200 to 400. In all cases, the daily commute is assumed to involve a 100-mi roundtrip with 2 individuals per vehicle. Considering shifts, holidays, and vacations,1250 roundtrips per day are assumed each day of the year during construction; 200 roundtrips per day are assumed each day during operations; and 150 roundtrips per day are assumed 250 days per year for the decontamination and dismantling portion of decommissioning. If the SAFSTOR decommissioning option is included in decommissioning, 20 roundtrips each day of the year are assumed for the caretaker workforce.

Table J-2 lists the review team's estimates of the carbon dioxide equivalent emissions associated with workforce transport. The table lists the assumptions used to estimate total miles traveled by each workforce and the factors used to convert total miles to metric tons CO_2 equivalent. CO_2 equivalent accounts for other greenhouse gases, such as methane and nitrous oxide, that are emitted by internal combustion engines. The workers are assumed to travel in gasoline powered passenger vehicles (cars, trucks, vans, and SUVs) that get an average of 19.7 mi per gallon of gas (FHWA 2006). Conversion from gallons of gasoline burned to CO_2 equivalent is based on Environmental Protection Agency emissions factors (EPA 2007a; 2007b).

Table J-2. Workforce CO_2 Footprint Estimates

	Construction Workforce	Operational Workforce	Decommissioning Workforce	SAFSTOR Workforce
Roundtrips per day	1250	200	150	20
Miles per roundtrip	100	100	100	100
Days per year	365	365	250	365
Years	7	40	10	40
Miles traveled	3.2×10^8	2.9×10^8	3.8×10^7	2.92×10^7
Miles per gallon[(a)]	19.7	19.7	19.7	19.7
Gallons fuel burned	1.6×10^7	1.5×10^7	1.9×10^6	1.58×10^6
Metric tons CO_2 per gallon[(b)]	8.81×10^{-3}	8.81×10^{-3}	8.81×10^{-3}	8.81×10^{-3}
Metric tons CO_2	1.4×10^5	1.3×10^5	1.7×10^4	1.3×10^4
CO_2 equivalent factor[(c)]	0.971	0.971	0.971	0.971
Metric tons CO_2 equivalent	1.5×10^5	1.3×10^5	1.7×10^4	1.3×10^4

(a) FHWA 2006

(b) EPA 2007b

(c) EPA 2007a

Published estimates of uranium fuel cycle CO_2 emissions required to support a nuclear power plant range from about 1 percent to about 5 percent of the CO_2 emissions from a comparably sized coal-fired plant (Sovacool 2008). A coal-fired power plant emits about 1 metric ton of CO_2 for each megawatt hour generated (Miller and Van Atten 2004). Therefore, for consistency with Table S-3 of 10 CFR 51.51, the NRC staff estimated the uranium fuel cycle CO_2 emissions as 0.05 metric tons of CO_2 per MWh generated and assumed an 80 percent capacity factor. Finally, the review team estimated the CO_2 emissions directly related to plant operations from the typical usage of various diesel generators onsite using EPA emissions factors (EPA 1995). The review team assumed an average of 600 hrs of emergency diesel generator operation per year (total for 4 generators) and 200 hrs of station blackout diesel generator operation per year (total for 2 generators).

Given the various sources of CO_2 emissions discussed above, the review team estimates the total life CO_2 footprint for a reference 1000 MW(e) nuclear power plant to be about 18 million metric tons. The components of the footprint are summarized in Table J-3. The uranium fuel cycle component of the footprint dominates all other components. It is directly related to power generated. As a result, it is reasonable to use reactor power to scale the footprint to larger reactors.

In closing, the review team considers the footprint estimated in Table J-3 to be appropriately conservative. The CO_2 emissions estimates for the dominant component (uranium fuel cycle) are based on 30 year old enrichment technology assuming that the energy required for enrichment is provided by coal-fired generation. Different assumptions related to the source of energy used for enrichment or the enrichment technology that would be just as reasonable could lead to a significantly reduced footprint.

Table J-3. 1000 MW(e) LWR Lifetime Carbon Dioxide Footprint

Source	Activity Duration (yr)	Total Emissions (metric tons)
Construction Equipment	7	3.5×10^4
Construction Workforce	7	1.5×10^5
Plant Operations	40	1.9×10^5
Operations Workforce	40	1.3×10^5
Uranium Fuel Cycle	40	1.4×10^7
Decommissioning Equipment	10	1.8×10^4
Decommissioning Workforce	10	1.7×10^4
SAFSTOR Workforce	40	1.3×10^4
TOTAL		1.5×10^7

Emissions estimates presented in the body of this EIS have been scaled to values that are appropriate for the proposed project. The uranium fuel cycle emissions have been scaled by reactor power using the scaling factor determined in Chapter 6 and by the number of reactors to be built. Plant operations emissions have been adjusted to represent the number of large CO_2 emissions sources (diesel generators, boilers, etc.) associated with the project. The workforce emissions estimates have been scaled to account for differences in workforce numbers and commuting distance. Finally, equipment emissions estimates have been scaled by estimated equipment usage. As can be seen in Table J-3, only the scaling of the uranium fuel cycle emissions estimates makes a significant difference in the total carbon footprint of the project.

J.1 References

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy,* Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

Federal Highway Administration (FHWA). 2006. *Highway Statistics 2005* (Table VM-1). Office of Highway Policy Information. Washington, D.C.

Miller, P.J., and C. Van Atten. 2004. *North American Power Plant Air Emissions*. Commission for Environmental Cooperation of North America, Montreal.

Sovacool, B.K. 2008. "Valuing the Greenhouse Gas Emissions from Nuclear Power: A Critical Survey." *Energy Policy* 36:2940–2953. Elsevier Ltd.

UniStar Nuclear Energy, LLC (UniStar). 2007. *Technical Report in Support of Application of UniStar Nuclear Operating Services, LLC for Certificate of Public Convenience and Necessity Before the Maryland Public Service Commission for Authorization to Construct Unit 3 at Calvert Cliffs Nuclear Power Plant and Associated Transmission Lines*. Prepared for the Public Service Commission of Maryland, dated November 6, 2007. Accession No. ML090680065.

U.S. Environmental Protection Agency (EPA). 1995. *Compilation of Air Pollutant Emission Factors Volume 1: Stationary and Point and Area Sources*. AP-42, 5th Edition. Office of Air and Radiation, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.

U.S. Environmental Protection Agency (EPA). 2007a. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2005* (Table 3-7). U.S. Environmental Protection Agency. Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2007b. "Conversion Factors to Energy Units (Heat Equivalents) Heat Contents and Carbon Content Coefficients of Various Fuel Types." *Inventory of U.S. Greenhouse Gas Emissions and Sinks: Fast Facts 1990–2005*. EPA-430-R-07-002. U.S. Environmental Protection Agency. Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2002. *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1 Regarding the Decommissioning of Nuclear Power Reactors*. NUREG-0586 S1, Vol. 1, Washington, D.C.

NRC FORM 335 (9-2004) NRCMD 3.7

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10. SUPPLEMENTARY NOTES

Docket Nos. 52-034 and 52-035

11. ABSTRACT *(200 words or less)*

This Environmental Impact Statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Luminant Generation Company LLC (Luminant), acting for itself and as agent for Nuclear Project Company LLC (subsequently renamed Comanche Peak Nuclear Power Company LLC), for combined licenses (COLs). The U.S. Army Corps of Engineers (Corps) is a cooperating agency on this EIS. This EIS includes the analysis by the NRC and Corps staff that considers and weighs the environmental impacts of constructing and operting two new nuclear units at the Comanche Peak Nuclear Power Plant site and at alternatives sites and mitigation measures available for reducing or avoiding adverse impacts.

After considering the environmental aspects of the proposed NRC action, the NRC staff's preliminary recommendation to the Commission is that the COL be issued as requested. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by Luminant, and responses to request for additional information; (2) consultation with Federal, State, Tribal and local agencies; (3) the staff's independent review; (4) the staff's consideration of comments related to the environmental review that were received during the public scoping process; and (5) the assessments summarized in the EIS, including the potential mitigation measures identified in the ER and this EIS.

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