NRC RA18-026

2017 Annual Radioactive Effluent Release Report

Part 4

Table R12.5.1-1 (Page 6 of 6)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

TABLE NOTATIONS

(1) Specific parameters of distance and direction from the centerline of the midpoint of the two units and additional description where pertinent, shall be provided for each and every sample location in Table R12.5.1-1, except for vegetation. For vegetation (both food product and vegetation exposure pathways), due to location variability year to year, the parameters of distance and direction shall be provided in the Annual Environmental Operating Report.

(2) Far field samples are analyzed when the respective near field sample results are inconsistent with previous measurements and radioactivity is confirmed as having its origin in airborne effluents from the station, or at the discretion of the ODCM Specialist.

(3) Airborne particulate sample filters shall be analyzed for gross beta radioactivity 24 hours or more after sampling to allow for radon and thoron daughter decay. If gross beta activity in air particulate samples is greater than 10 times the yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

(4) Gamma isotopic analysis means the identification and quantification of gamma emitting radionuclides that may be attributable to the effluents from the station.

(5) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation. The 40 locations is not an absolute number. The number of direct radiation monitoring stations may be reduced according to geographical limitations; e.g., if a station is adjacent to a lake, some sectors may be over water thereby reducing the number of dosimeters that could be placed at the indicated distances. The frequency of analysis or readout for Field Dosimeter systems will depend upon the characteristics of the specific system used and should be selected to obtain optimum dose information with minimal fading.

(6) Groundwater samples shall be taken when this source is tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties are suitable for contamination.

(7) The "downstream" sample shall be taken in an area beyond but near the mixing zone. The "upstream sample" shall be taken at a distance beyond significant influence of the discharge. Upstream samples in an estuary must be taken far enough upstream to be beyond the station influence.

(8) If milking animals are not found in the designated indicator locations, or if the owners decline to participate in the REMP, all milk sampling may be discontinued. See the vegetation exposure pathway for additional sampling requirements.

(9) I-131 analysis means the analytical separation and counting procedure are specific for this radionuclide.

(10) One sample shall consist of a volume/weight of sample large enough to fill contractor specified container.

(11) The provisions of RSR 12.0.2 and RSR 12.0.3 are not applicable to the REMP.

Table R12.5.1-2

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES
REPORTING LEVELS

ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GASES (pCi/m^3)	FISH (pCi/kg, wet)	MILK (pCi/l)	FOOD PRODUCTS (pCi/kg, wet)
H-3	20,000(1)				
Mn-54	1,000		30,000		
Fe-59	400		10,000		
Co-58	1,000		30,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr-Nb-95	400				
I-131	2(2)	0.9		3	100
Cs-134	30	10	1,000	60	1,000
Cs-137	50	20	2,000	70	2,000
Ba-La-140	200			300	

(1) For drinking water samples. This is 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi/l may be used.
(2) If no drinking water pathway exists, a value of 20 pCi/l may be used.

Table R12.5.1-3

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS[a]

LOWER LIMIT OF DETECTION (LLD)[b]

ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GASES (pCi/m^3)	FISH (pCi/kg, wet)	MILK (pCi/l)	FOOD PRODUCTS (pCi/kg, wet)	SEDIMENT/SOIL (pCi/kg, dry)
Gross Beta	4	0.01				
H-3	2,000					
Mn-54	15		130			
Fe-59	30		260			
Co-58,60	15		130			
Zn-65	30		260			
Zr-95	30					
Nb-95	15					
I-131	1[c]	0.07		1	60	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-140	60			60		
La-140	15			15		

(a) All peaks identified at the 95% confidence level, shall also be analyzed and reported.
(b) Most restrictive ODCM LLD requirement or technical requirement. The reported minimum detectable concentration (MDC) shall be $\leq$ these values.
(c) If no drinking water pathway exists, a value of 15 pCi/l may be used (NUREG 1301/1302)

12.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

12.5.2 Land Use Census

REC 12.5.2 A Land Use Census shall be conducted and shall identify within a distance of 10 km (6.2 miles) the location in each of the 16 meteorological sectors of the nearest milk animal, the nearest residence, and an enumeration of livestock. For dose calculation, a garden will be assumed at the nearest residence.

----------NOTES----------

1. The 16 meteorological sectors requirement may be reduced according to geographical limitations; e.g. at a lake site where some sectors will be over water.
2. The nearest industrial facility shall also be documented if closer than the nearest residence.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.1 and A.2 shall be completed if this Condition is entered. ---------- Land use census identifies a location which yields a calculated dose or dose commitment, via the same exposure pathway, that is at least 20% greater than at a location from which samples are currently being obtained in accordance with REC 12.5.1.	A.1 Add the new location to the Radiological Environmental Monitoring Program (REMP). AND	30 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 ----------NOTE---------- The sampling location(s), excluding the control location, having the lowest calculated dose or dose commitment(s), via the same exposure pathway, may be deleted from the REMP after October 31 of the year in which Land Use Census was conducted. ---------- Submit the documentation for a change in the ODCM in the next Annual Radiological Environmental Operating Report and include the revised figures and tables for the ODCM reflecting the new location(s) with information supporting the change in sampling locations.	In accordance with Technical Specification 5.6.2.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.5.2.1	Conduct a land use census during the growing season, between June 1 and October 1, using information that will provide the best results, such as by a door-to-door survey, aerial survey, or by consulting local agriculture authorities. The results of the census shall be included in the Annual Radiological Environmental Operating Report.	--------NOTE-------- RSR 12.0.2 and 12.0.3 are not applicable. ---------- 12 months

12.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

12.5.3 Interlaboratory Comparison Program

REC 12.5.3 Analyses shall be performed on radioactive materials supplied as part of an Interlaboratory Comparison Program that is traceable to NIST.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.1 shall be completed if this Condition is entered. ---------- Requirements of the REC not met.	A.1 Report corrective actions to prevent recurrence to the NRC in the next Annual Radiological Environmental Operating Report.	In accordance with Technical Specification 5.6.2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.5.3	Include a summary of the results of the Interlaboratory Comparison Program in the Annual Radiological Environmental Operating Report.	In accordance with Technical Specification 5.6.2

12.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

12.5.4 Meteorological Monitoring Program (NOT APPLICABLE)

12.6 REPORTING REQUIREMENTS

12.6.1 Annual Radiological Environmental Operating Report

12.6.1.1 Routine Annual Radiological Environmental Operating Report covering the operation of the Units during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and an analysis of trends of the results of the radiological environmental monitoring program for the report period. The material provided shall be consistent with the objectives outlined in the Offsite Dose Calculation Manual, and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.c. It should include, as found appropriate, a comparison of preoperational studies with operational controls or with previous environmental surveillance reports, and an assessment of the observed impacts of the plant operation on the environment. A single submittal may be made for a multiple unit station. The submittal should combine sections common to all units at the station.

12.6.1.2 The Annual Radiological Environmental Operating Report shall include the results of all radiological environmental samples and of all environmental radiation measurements taken during the period pursuant to the locations specified in the tables and figures in Part II, Section 6 of the ODCM, as well as summarized and tabulated results of these analyses and measurements in the format of the table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979. In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

12.6.1.3 The reports shall also include the following: a summary description of the Radiological Environmental Monitoring Program; legible maps covering all sampling locations keyed to a table giving distances and directions from the midpoint between the two units; reasons for not conducting the Radiological Environmental Monitoring Program as required by REC 12.5.1, and discussion of all deviations from the sampling schedule of Table R12.5.1-1; a Table of Missed Samples and a Table of Sample Anomalies for all deviations from the sampling schedule of ODCM Part II, Table 6.1-1; discussion of environmental sample measurements that exceed the reporting levels of Table R12.5.1-2 but are not the result of plant effluents; discussion of all analyses in which the LLD required by Table R12.5.1-3 was not achievable; results of the Land Use Census required by REC 12.5.2; and the results of licensee participation in an Interlaboratory Comparison Program and the corrective actions being taken if the specified program is not being performed as required by REC 12.5.3.

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12.6 REPORTING REQUIREMENTS

12.6.1 Annual Radiological Environmental Operating Report (continued)

12.6.1.4 The Annual Radiological Environmental Operating Report shall also include an annual summary of hourly meteorological data collected over the previous year. This annual summary may be either in the form of an hour-by-hour listing on magnetic tape of wind speed, wind direction, atmospheric stability, and precipitation (if measured), or in the form of joint frequency distributions of wind speed, wind direction, and atmospheric stability. In lieu of submission with the Annual Radiological Environmental Operating Report, the licensee has the option of retaining the summary of required meteorological data on site in a file that shall be provided to the NRC upon request.

12.6.1.5 The Annual Radiological Environmental Operating Report shall also include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released from the unit or station during the previous calendar year. This report shall also include an assessment of radiation doses to the most likely exposed MEMBER OF THE PUBLIC from reactor releases and other nearby uranium fuel cycle sources, including doses from primary effluent pathways and direct radiation, for the previous calendar year. The assessment of radiation doses shall be performed in accordance with the methodology and parameters in the ODCM and in compliance with 10 CFR 20 and 40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operation."

12.6 REPORTING REQUIREMENTS

12.6.2 Annual Radioactive Effluent Release Report

12.6.2.1 The radioactive effluent release reports covering the operation of the unit during the previous calendar year of operation shall be submitted in accordance with 10 CFR 50.36a prior to May 1 of each year. The report shall include a summary of the quantities of radioactive liquid and gaseous effluent and solid waste released from the unit. The material provided shall be consistent with the objectives outlined in the ODCM and the PROCESS CONTROL PROGRAM and in conformance with 10 CFR 50.36a and 10 CFR 50, Appendix I, Section IV.B.1. A single submittal may be made for a multiple unit station. The submittal should combine those sections that are common to all units at the station; however, for units with separate radwaste systems, the submittal shall specify the releases of radioactive material from each unit.

12.6.2.2 The radioactive effluent release reports shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit as outlined in Regulatory Guide 1.21, "Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof.

12.6.2.3 The radioactive effluent release report shall include the following information for each type of solid waste shipped offsite during the report period:

1. Container volume,
2. Total curie quantity (specify whether determined by measurement or estimate),
3. Principal radionuclides (specify whether determined by measurement or estimate),
4. Type of waste (e.g., spent resin, compacted dry waste, evaporator bottoms),
5. Type of container (e.g., LSA, Type A, Type B, Large Quantity), and
6. Solidification agent (e.g., cement, urea formaldehyde).

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12.6 REPORTING REQUIREMENTS

12.6.2 Radioactive Effluent Release Report (continued)

12.6.2.4 The radioactive effluent release reports shall include unplanned releases from the site to unrestricted areas of radioactive materials in gaseous and liquid effluents on a quarterly basis.

12.6.2.5 The radioactive effluent release reports shall include any changes to the PROCESS CONTROL PROGRAM (PCP) made during the reporting period.

12.6.2.6 The radioactive effluent release reports shall include a description of licensee initiated major changes to the radioactive waste treatment systems (liquid, gaseous and solid), as described in Section 12.6.3.)

12.6 REPORTING REQUIREMENTS

12.6.3 Offsite Dose Calculation Manual (ODCM)

12.6.3.1 The ODCM is common to LaSalle Unit 1 and LaSalle Unit 2. The ODCM shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring alarm and trip setpoints, and in the conduct of the radiological environmental monitoring program; and

12.6.3.2 The ODCM shall also contain the radioactive effluent controls and radiological environmental monitoring activities, and descriptions of the information that should be included in the Annual Radiological Environmental Operating, and Radioactive Effluent Release Reports required by Technical Specifications 5.6.2 and 5.6.3.

12.6.3.3 Licensee-initiated changes to the ODCM:

a. Shall be documented and records of reviews performed shall be retained as required by the Quality Assurance (QA) Manual. This documentation:

   1. Shall contain sufficient information to support the change(s) together with the appropriate analyses or evaluations justifying the change(s); and

   2. Shall contain a determination that the change(s) maintain the level of radioactive effluent control required by 10 CFR 20.1302, 40 CFR Part 190, 10 CFR 50.36a, and 10 CFR Part 50, Appendix I, and not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations.

   3. Shall become effective after approval of the Plant Manager.

   4. Shall be submitted to the NRC in the form of a complete, legible copy of the entire ODCM as a part of or concurrent with the Radioactive Effluent Release Report for the period of the report in which any change to the ODCM was made. Each change shall be identified by markings in the margin of the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (i.e., month and year) the change was implemented.

12.6 REPORTING REQUIREMENTS

12.6.4 Major Changes to Radioactive Waste Treatment Systems (Liquid and Gaseous)

12.6.4.1 Licensee initiated major changes to the radioactive waste treatment systems (liquid and gaseous):

a. Shall be reported to the Commission in the Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the Plant Operations Review Committee (PORC). The discussion of each change shall contain:

1. A summary of the evaluation that led to the determination that the change could be made in accordance with 10 CFR 50.59;

2. Sufficient detailed information to totally support the reason for the change without benefit or additional or supplemental information;

3. A detailed description of the equipment, components and processes involved and the interfaces with other plant systems;

4. An evaluation of the change which shows the predicted releases of radioactive materials in liquid and gaseous effluents waste that differ from those previously predicted in the license application and amendments thereto;

5. An evaluation of the change which shows the expected maximum exposures to individual in the unrestricted area and to the general population that differ from those previously estimated in the license application and amendments thereto;

6. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents, to the actual releases for the period to when the changes are to be made;

7. An estimate of the exposure to plant operating personnel as a result of the change; and

8. Documentation of the fact that the change was reviewed and found acceptable by the PORC.

b. Shall become effective upon review and acceptance by the PORC.

BASES

General

It is expected that releases of radioactive material in effluents will be kept at small fractions of the limits specified in Section 20.1302 of 10 CFR, Part 20. At the same time, the licensee is permitted the flexibility of operation, compatible with consideration of health and safety, to assure that the public is provided a dependable source of power even under unusual operating conditions which may temporarily result in releases higher than such small fractions, but still within the limits specified in Section 20.1302 of 10 CFR, Part 20. It is expected that in using this operational flexibility under unusual operating conditions the licensee will exert his best efforts to keep levels of radioactive material in effluents as low as practicable.

B 12.0 OFFSITE DOSE CALCULATION MANUAL (ODCM) RADIOLOGICAL EFFLUENT CONTROL (REC) APPLICABILITY

BASES

RECs

REC 12.0.1 through REC 12.0.6 establish the general requirements applicable to all RECs in Sections 12.1 through 12.5 and apply at all times, unless otherwise stated.

REC 12.0.1

REC 12.0.1 establishes the Applicability statement within each individual REC as the requirement for when the REC is required to be met (i.e., when the unit is in the MODES or other specified conditions of the Applicability statement of each Requirement).

REC 12.0.2

REC 12.0.2 establishes that upon discovery of a failure to meet a REC, the associated ACTIONS shall be met. The Completion Time of each Required Action for an ACTIONS Condition is applicable from the point in time that an ACTIONS Condition is entered. The Required Actions establish those remedial measures that must be taken within specified Completion Times when the requirements of a REC are not met. This Requirement establishes that:

a. Completion of the Required Actions within the specified Completion Times constitutes compliance with a REC; and

b. Completion of the Required Actions is not required when a REC is met within the specified Completion Time, unless otherwise specified.

There are two basic types of Required Actions. The first type of Required Action specifies a time limit in which the REC must be met. This time limit is the Completion Time to restore an inoperable system or component to OPERABLE status or to restore variables to within specified limits. If this type of Required Action is not completed within the specified Completion Time, a shutdown may be required to place the unit in a MODE or condition in which the REC is not applicable. (Whether stated as a Required Action or not, correction of the entered Condition is an action that may always be considered upon entering ACTIONS.) The second type of Required

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BASES

REC 12.0.2 (continued)

Action specifies the remedial measures that permit continued operation of the unit that is not further restricted by the Completion Time. In this case, compliance with the Required Actions provides an acceptable level of safety for continued operation.

Completing the Required Actions is not required when a REC is met or is no longer applicable, unless otherwise stated in the individual RECs.

The nature of some Required Actions of some Conditions necessitates that, once the Condition is entered, the Required Actions must be completed even though the associated Condition no longer exists. The individual REC's ACTIONS specify the Required Actions where this is the case. An example of this is in REC 12.4.2, "Dose from Noble Gases."

The Completion Times of the Required Actions are also applicable when a system or component is removed from service intentionally. The reasons for intentionally relying on the ACTIONS include, but are not limited to, performance of Surveillances, preventive maintenance, corrective maintenance, or investigation of operational problems. Entering ACTIONS for these reasons must be done in a manner that does not compromise safety. Intentional entry into ACTIONS should not be made for operational convenience. Additionally, if intentional entry into ACTIONS would result in redundant equipment being inoperable, alternatives should be used instead. Doing so limits the time both subsystems/divisions of a function are inoperable and limits the time conditions exist which may result in REC 12.0.3 being entered. Individual RECs may specify a time limit for performing a RSR when equipment is removed from service or bypassed for testing. In this case, the Completion Times of the Required Actions are applicable when this time limit expires, if the equipment remains removed from service or bypassed.

When a change in MODE or other specified condition is required to comply with Required Actions, the unit may enter a MODE or other specified condition in which another REC becomes applicable. In this case, the Completion Times of the associated Required Actions would apply from the point in time that the new REC becomes applicable and the ACTIONS Condition(s) are entered.

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BASES (continued)

REC 12.0.3

REC 12.0.3 establishes the actions that must be implemented when a REC is not met and:

a. An associated Required Action and Completion Time is not met and no other Condition applies; or

b. The condition of the unit is not specifically addressed by the associated ACTIONS. This means that no combination of Conditions stated in the ACTIONS can be made that exactly corresponds to the actual condition of the unit. Sometimes, possible combinations of Conditions are such that entering REC 12.0.3 is warranted; in such cases, the ACTIONS specifically state a Condition corresponding to such combinations and also that REC 12.0.3 be entered immediately.

Upon entering REC 12.0.3, 1 hour is allowed to implement appropriate compensatory actions and verify the plant is not in an unanalyzed condition or that a required safety function is not compromised. Within 12 hours, Shift Operations Superintendent or designee approval of the compensatory actions and the plan for exiting REC 12.0.3 must be obtained. The use and interpretation of specified times to complete the actions of REC 12.0.3 are consistent with the discussion of Section 1.3, Completion Times.

The actions required in accordance with REC 12.0.3 may be terminated and REC 12.0.3 exited if any of the following occurs:

a. The REC is now met.

b. A Condition exists for which the Required Actions have now been performed.

c. ACTIONS exist that do not have expired Completion Times. These Completion Times are applicable from the point in time that the Condition is initially entered and not from the time REC 12.0.3 is exited.

(continued)

BASES

REC 12.0.3 (continued)

In MODES 1, 2, and 3, REC 12.0.3 provides actions for Conditions not covered in other Requirements. The requirements of REC 12.0.3 do not apply in MODES 4 and 5 because the unit is already in the most restrictive Condition. The requirements of REC 12.0.3 do not apply in other specified conditions of the Applicability (unless in MODE 1, 2, or 3) because the ACTIONS of individual RECs sufficiently define the remedial measures to be taken.

REC 12.0.4

REC 12.0.4 establishes limitations on changes in MODES or other specified conditions in the Applicability when an REC is not met. It precludes placing the unit in a MODE or other specified condition stated in that Applicability (e.g., Applicability desired to be entered) when the following exist:

a. Unit conditions are such that the requirements of the REC would not be met in the Applicability desired to be entered; and

b. Continued noncompliance with the REC requirements, if the Applicability were entered, would result in the unit being required to exit the Applicability desired to be entered to comply with the Required Actions.

Compliance with Required Actions that permit continued operation of the unit for an unlimited period of time in a MODE or other specified condition provides an acceptable level of safety for continued operation. This is without regard to the status of the unit before or after the MODE change. Therefore, in such cases, entry into a MODE or other specified condition in the Applicability may be made in accordance with the provisions of the Required Actions. The provisions of this REC should not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components to OPERABLE status before entering an associated MODE or other specified condition in the Applicability.

The provisions of REC 12.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS. In addition, the provisions of REC 12.0.4 shall not prevent

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BASES

REC 12.0.4 (continued)

changes in MODES or other specified conditions in the Applicability that result from any unit shutdown.

Exceptions to REC 12.0.4 are stated in the individual RECs. The exceptions allow entry into MODES or other specified conditions in the Applicability when the associated ACTIONS to be entered do not provide for continued operation for an unlimited period of time. Exceptions may apply to all the ACTIONS or to a specific Required Action of a REC.

Surveillances do not have to be performed on the associated inoperable equipment (or on variables outside the specified limits), as permitted by RSR 12.0.1. Therefore, changing MODES or other specified conditions while in an ACTIONS Condition, either in compliance with REC 12.0.4, or where an exception to REC 12.0.4 is stated, is not a violation of RSR 12.0.1 or RSR 12.0.4 for those Surveillances that do not have to be performed due to the associated inoperable equipment. However, RSRs must be met to ensure OPERABILITY prior to declaring the associated equipment OPERABLE (or variable within limits) and restoring compliance with the affected REC.

REC 12.0.4 is only applicable when entering MODE 3 from MODE 4, MODE 2 from MODE 3 or 4, or MODE 1 from MODE 2. Furthermore, REC 12.0.4 is applicable when entering any other specified condition in the Applicability only while operating in MODE 1, 2, or 3. The requirements of REC 12.0.4 do not apply in MODES 4 and 5, or in other specified conditions of the Applicability (unless in MODE 1, 2, or 3) because the ACTIONS of individual Requirements sufficiently define the remedial measures to be taken.

REC 12.0.5

REC 12.0.5 establishes the allowance for restoring equipment to service under administrative controls when it has been removed from service or declared inoperable to comply with ACTIONS. The sole purpose of this Requirement is to provide an exception to REC 12.0.2 (e.g., to not comply with the applicable Required Action(s)) to allow the performance of required testing to demonstrate:

a. The OPERABILITY of the equipment being returned to service; or

(continued)

BASES

REC 12.0.5 (continued)

b. The OPERABILITY of other equipment.

The administrative controls ensure the time the equipment is returned to service in conflict with the requirements of the ACTIONS is limited to the time absolutely necessary to perform the required testing to demonstrate OPERABILITY. This Requirement does not provide time to perform any other preventive or corrective maintenance.

An example of demonstrating the OPERABILITY of other equipment is taking an inoperable channel or trip system out of the tripped condition to prevent the trip function from occurring during the performance of required testing on another channel in the other trip system. A similar example of demonstrating the OPERABILITY of other equipment is taking an inoperable channel or trip system out of the tripped condition to permit the logic to function and indicate the appropriate response during the performance of required testing on another channel in the same trip system.

REC 12.0.6

REC 12.0.6 establishes the applicability of each REC to both Unit 1 and Unit 2 operation. Whenever a requirement applies to only one unit, or is different for each unit, this will be identified in the appropriate section of the REC (e.g., Applicability, RSR, etc.) with parenthetical reference, Notes, or other appropriate presentation within the body of the requirement.

B 12.0 ODCM RADIOLOGICAL SURVEILLANCE REQUIREMENT (RSR) APPLICABILITY

BASES

RSRs

RSR 12.0.1 through RSR 12.0.5 establish the general requirements applicable to all Requirements in 12.1 through 12.5 and apply at all times, unless otherwise stated.

RSR 12.0.1

RSR 12.0.1 establishes the requirement that RSRs must be met during the MODES or other specified conditions in the Applicability for which the requirements of the REC apply, unless otherwise specified in the individual RSRs. This REC is to ensure that RSRs are performed to verify the OPERABILITY of systems and components, and that variables are within specified limits. Failure to meet a RSR within the specified Frequency, in accordance with RSR 12.0.2, constitutes a failure to meet a REC.

Systems and components are assumed to be OPERABLE when the associated RSRs have been met. Nothing in this RSR, however, is to be construed as implying that systems or components are OPERABLE when:

a. The systems or components are known to be inoperable, although still meeting the RSRs; or

b. The requirements of the RSR(s) are known to be not met between required RSR performances.

RSR do not have to be performed when the unit is in a MODE or other specified condition for which the requirements of the associated REC are not applicable, unless otherwise specified.

Unplanned events may satisfy the requirements (including applicable acceptance criteria) for a given RSR. In this case, the unplanned event may be credited as fulfilling the performance of the RSR.

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BASES

RSR 12.0.1 (continued)

RSRs, including RSRs invoked by Required Actions, do not have to be performed on inoperable equipment because the ACTIONS define the remedial measures that apply. RSRs have to be met and performed in accordance with RSR 12.0.2, prior to returning equipment to OPERABLE status.

Upon completion of maintenance, appropriate post maintenance testing is required to declare equipment OPERABLE. This includes ensuring applicable RSRs are not failed and their most recent performance is in accordance with RSR 12.0.2. Post maintenance testing may not be possible in the current MODE or other specified conditions in the Applicability due to the necessary unit parameters not having been established. In these situations, the equipment may be considered OPERABLE provided testing has been satisfactorily completed to the extent possible and the equipment is not otherwise believed to be incapable of performing its function. This will allow operation to proceed to a MODE or other specified condition where other necessary post maintenance tests can be completed.

RSR 12.0.2

RSR 12.0.2 establishes the requirements for meeting the specified Frequency for RSRs and any Required Action with a Completion Time that requires the periodic performance of the Required Action on a "once per..." interval.

RSR 12.0.2 permits a 25% extension of the interval specified in the Frequency. This extension facilitates RSR scheduling and considers plant operating conditions that may not be suitable for conducting the RSR (e.g., transient conditions or other ongoing RSR or maintenance activities).

The 25% extension does not significantly degrade the reliability that results from performing the RSR at its specified Frequency. This is based on the recognition that the most probable result of any particular RSR being performed is the verification of conformance with the RSRs.

As stated in RSR 12.0.2, the 25% extension also does not apply to the initial portion of a periodic Completion Time that requires performance on a "once per..." basis. The 25% extension applies to each performance after the initial performance. The initial performance of the Required Action,

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BASES

RSR 12.0.2 (continued)

whether it is a particular RSR or some other remedial action, is considered a single action with a single Completion Time. One reason for not allowing the 25% extension to this Completion Time is that such an action usually verifies that no loss of function has occurred by checking the status of redundant or diverse components or accomplishes the function of the inoperable equipment in an alternative manner.

The provisions of RSR 12.0.2 are not intended to be used repeatedly merely as an operational convenience to extend RSR intervals (other than those consistent with refueling intervals) or periodic Completion Time intervals beyond those specified.

RSR 12.0.3

RSR 12.0.3 establishes the flexibility to defer declaring affected equipment inoperable or an affected variable outside the specified limits when a RSR has not been completed within the specified Frequency. A delay period of up to 24 hours or up to the limit of the specified Frequency, whichever is greater, applies from the point in time it is discovered that the RSR has not been performed in accordance with RSR 12.0.2, and not at the time that the specified Frequency was not met. This delay period provides adequate time to complete RSRs that have been missed. This delay period permits the completion of a RSR before complying with Required Actions or other remedial measures that might preclude completion of the RSR.

The basis for this delay period includes consideration of unit conditions, adequate planning, availability of personnel, the time required to perform the RSR, the safety significance of the delay in completing the required RSR, and the recognition that the most probable result of any particular RSR being performed is the verification of conformance with the requirements.

When a RSR with a Frequency based not on time intervals, but upon specified unit conditions, operating situations, or requirements of regulations (e.g., prior to each release, or in accordance with the Radioactive Liquid Waste Sampling and Analysis Program, etc.) is discovered to not have been

(continued)

BASES

RSR 12.0.3 (continued)

performed when specified, RSR 12.0.3 allows for the full delay period of up to the specified Frequency to perform the RSR. However, since there is not a time interval specified, the missed RSR should be performed at the first reasonable opportunity.

RSR 12.0.3 provides a time limit for, and allowances for the performance of, RSRs that become applicable as a consequence of MODE changes imposed by Required Actions.

Failure to comply with specified Frequencies for RSRs is expected to be an infrequent occurrence. Use of the delay period established by RSR 12.0.3 is a flexibility which is not intended to be used as an operational convenience to extend RSR intervals. While up to 24 hours or the limit of the specified Frequency is provided to perform the missed RSR, it is expected that the missed RSR will be performed at the first reasonable opportunity. The determination of the first reasonable opportunity should include consideration of the impact on plant risk (from delaying the RSR as well as any plant configuration changes required or shutting the plant down to perform the RSR) and impact on any analysis assumptions, in addition to unit conditions, planning, availability of personnel, and the time required to perform the RSR. This risk impact should be managed through the program in place to implement 10 CFR 50.65(a)(4) and its implementation guidance, NRC Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants." This Regulatory Guide addresses consideration of temporary and aggregate risk impacts, determination of risk management action thresholds, and risk management action up to and including plant shutdown. The missed RSR should be treated as an emergent condition as discussed in the Regulatory Guide. The risk evaluation may use quantitative, qualitative, or blended methods. The degree of depth and rigor of the evaluation should be commensurate with the importance of the component. Missed RSRs for important components should be analyzed quantitatively. If the results of the risk evaluation determine the risk increase is significant, this evaluation should be used to determine the safest course of action. All missed RSRs will be placed in the station's Corrective Action Program.

(continued)

BASES

RSR 12.0.3 (continued)

If a RSR is not completed within the allowed delay period, then the equipment is considered inoperable or the variable then is considered outside the specified limits and the Completion Times of the Required Actions for the applicable REC Conditions begin immediately upon expiration of the delay period. If a RSR is failed within the delay period, then the equipment is inoperable, or the variable is outside the specified limits and the Completion Times of the Required Actions for the applicable REC Conditions begin immediately upon the failure of the RSR.

Completion of the RSR within the delay period allowed by this RSR, or within the Completion Time of the ACTIONS, restores compliance with RSR 12.0.1.

RSR 12.0.4

RSR 12.0.4 establishes the requirement that all applicable RSRs must be met before entry into a MODE or other specified condition in the Applicability.

This RSR ensures that system and component OPERABILITY requirements and variable limits are met before entry into MODES or other specified conditions in the Applicability for which these systems and components ensure safe operation of the unit.

The provisions of this RSR should not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components to OPERABLE status before entering an associated MODE or other specified condition in the Applicability.

However, in certain circumstances, failing to meet a RSR will not result in RSR 12.0.4 restricting a MODE change or other specified condition change. When a system, subsystem, division, component, device, or variable is inoperable or outside its specified limits, the associated RSR(s) are not required to be performed per RSR 12.0.1 which states that RSRs do not have to be performed on inoperable equipment. When equipment is inoperable, RSR 12.0.4 does not apply to the associated RSR(s) since the requirement for the RSR(s) to be performed is removed. Therefore, failing to perform the RSRs within the specified Frequency, on equipment that is inoperable, does not result in a RSR 12.0.4 restriction to changing MODES or other specified conditions of the Applicability. However, since the REC is not met in this instance, REC 12.0.4 will govern any restrictions that may (or may not) apply to MODE or other specified condition changes.

(continued)

BASES

RSR 12.0.4 (continued)

The provisions of RSR 12.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS. In addition, the provisions of RSR 12.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that result from any unit shutdown.

The precise requirements for performance of RSRs are specified such that exceptions to RSR 12.0.4 are not necessary. The specific time frames and conditions necessary for meeting the RSRs are specified in the Frequency, in the RSR, or both. This allows performance of RSRs when the prerequisite condition(s) specified in a RSR procedure require entry into the MODE or other specified condition in the Applicability of the associated REC prior to the performance or completion of a RSR. A RSR that could not be performed until after entering the REC Applicability would have its Frequency specified such that it is not "due" until the specific conditions needed are met. Alternately, the RSR may be stated in the form of a Note as not required (to be met or performed) until a particular event, condition, or time has been reached. Further discussion of the specific formats of RSRs' annotation is found in Section 1.4, Frequency.

RSR 12.0.4 is only applicable when entering MODE 3 from MODE 4, MODE 2 from MODE 3 or 4, or MODE 1 from MODE 2. Furthermore, RSR 12.0.4 is applicable when entering any other specified condition in the Applicability only while operating in MODE 1, 2, or 3. The requirements of RSR 12.0.4 do not apply in MODES 4 and 5, or in other specified conditions of the Applicability (unless in MODE 1, 2, or 3) because the ACTIONS of individual Controls sufficiently define the remedial measures to be taken.

RSR 12.0.5

RSR 12.0.5 establishes the applicability of each RSR to both Unit 1 and Unit 2 operation. Whenever a requirement applies to only one unit, or is different for each unit, this will be identified with parenthetical reference, Notes, or other appropriate presentation within the RSR.

B 12.1 NOT USED

INTENTIONALLY BLANK

B 12.2 INSTRUMENTATION

B 12.2.1 Radioactive Liquid Effluent Monitoring Instrumentation

BASES

The radioactive liquid effluent monitoring instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of RECS. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

B 12.2 INSTRUMENTATION

B 12.2.2 Radioactive Gaseous Effluent Monitoring Instrumentation

BASES

The radioactive gaseous effluent monitoring instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of RECS.

B 12.3 LIQUID EFFLUENTS

B 12.3.1 Liquid Effluent Concentration

BASES

This control is provided to ensure that the concentration of radioactive materials released in liquid waste effluents from the site will be less than ten (10) times the concentration levels specified in Appendix B, Table 2, Column 2 to 10 CFR 20.1001-2402. This limitation provides additional assurance that the levels of radioactive materials in bodies of water outside the site will result in exposure within (1) the Section II.A design objectives of Appendix I, 10 CFR 50, to an individual, and (2) the limits of 10 CFR 20.1301 to the population. In addition, this limit is associated with 40 CFR 141 which states concentration limits at the nearest downstream potable water supply. The results of the analyses of RSR 12.3.1.1, 12.3.1.2, and 12.3.1.3 shall be used with the calculational methods in the ODCM to assure that the concentrations at the point of release are maintained within the limits of this REC. Refer to Technical Specification 5.5.9.b for the definition of an outside temporary tank.

B.12.3 LIQUID EFFLUENTS

B 12.3.2 Dose From Liquid Effluents

BASES

This control is provided to implement the requirements of Sections II.A, III.A and IV.A of Appendix I, 10 CFR Part 50. The REC implements the guides set forth in Section II.A of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in liquid effluents will be kept "as low as is reasonably achievable." Also, for fresh water sites with drinking water supplies which can be potentially affected by plant operations, there is reasonable assurance that the operation of the facility will not result in radionuclide concentrations in the finished drinking water that are in excess of the requirements of 40 CFR 141. The dose calculations in the ODCM implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data, such that the actual exposure of an individual through appropriate pathways is unlikely to be substantially underestimated. The equations specified in the ODCM for calculating the doses due to the actual release rates of radioactive materials in liquid effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," April 1977.

This control applies to the release of radioactive materials in liquid effluents from each reactor at the site. For units with shared radwaste treatment systems, the liquid effluents from the shared systems are proportioned among the units sharing that system.

B 12.3 LIQUID EFFLUENTS

B 12.3.3 Liquid Radwaste Treatment Systems

BASES

The OPERABILITY of the liquid radwaste treatment system ensures that this system will be available for use whenever liquid effluents require treatment prior to release to the environment. The requirement that the appropriate portions of this system be used when specified provides assurance that the releases of radioactive materials in liquid effluents will be kept "as low as is reasonably achievable." A system bypass allows connection to portable waste treatment equipment. This enables the efficient processing of liquid radwaste through the use of state-of-the-art radwaste processing technology. The portable radwaste treatment system may be used in lieu of various portions of the liquid radwaste treatment system. When a portable waste treatment is not used, RSR 12.3.3.2 may be extended to 180 days. This control implements the requirements of 10 CFR Part 50.36a. General Design Criterion 50 of Appendix A to 10 CFR Part 50 and the design objective given in Section II.0 of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the liquid radwaste treatment system were specified as a suitable fraction of the dose design objectives set forth in Section II.A of Appendix I, 10 CFR Part 50, for liquid effluents. This specification implements Technical Specification Section 5.5.4.f for liquid effluents.

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.1 Gaseous Effluent Dose Rates

BASES

This control is provided to ensure that the dose at any time at the site boundary from gaseous effluents from all units on the site will be within the annual dose limits of RECS for unrestricted areas. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of an individual in an unrestricted area, either within or outside the site boundary exceeding the limits specified in 10 CFR 20.1301. For individuals who may at times be within the site boundary, the occupancy of the individual will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the site boundary. The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to an individual at or beyond the site boundary to less than or equal to a dose rate of 500 mrem/year to the total body or to less than or equal to a dose rate of 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background via the inhalation pathway to less than or equal to a dose rate of 1500 mrem/year.

This control applies to the release of radioactive effluents in gaseous effluents from all reactors at the site. For units within shared radwaste treatment systems, the gaseous effluents from the shared system are proportioned among the units sharing that system.

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.2 Dose from Noble Gases

BASES

This control is provided to implement the requirements of Sections II.B, III.A and IV.A of Appendix I, 10 CFR Part 50. The Operability Requirements are the guides set forth in Section II.B of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in gaseous effluents will be kept "as low as is reasonably achievable." The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of an individual through appropriate pathways is unlikely to be substantially underestimated. The dose calculations established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I, "Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water Cooled Reactors," Revision 1, July 1977. The ODCM equations provided for determining the air doses at the site boundary are based upon the historical average atmospheric conditions

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.3 Dose from Iodine-131, Iodine-133, Tritium and Radioactive Materials in Particulate Form

BASES

The control is provided to implement the requirements of Sections II.C, III.A and IV.A of Appendix I, 10 CFR Part 50. The operability requirements are the guides set forth in Section II.C of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable." The ODCM calculational methods specified in the Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data, such that the actual exposure of an individual through appropriate pathways is unlikely to be substantially underestimated. The ODCM calculational methods for calculating the doses due to the actual release rates of the subject materials are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I, "Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," Revision 1, July 1977. These equations also provide for determining the actual doses based upon the historical average atmospheric conditions. The release rate specifications for radioiodines, radioactive materials in particulate form and radionuclides other than noble gases are dependent on the existing radionuclide pathways to man, in the unrestricted area. The pathways which were examined in the development of these calculations were: 1) individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, 3) deposition onto grassy areas where milk animals and meat producing animals graze with consumption of the milk and meat by man, and 4) deposition on the ground with subsequent exposure of man.

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.4 GASEOUS RADWASTE TREATMENT (OFF-GAS) SYSTEM

BASES

The OPERABILITY of the GASEOUS RADWASTE TREATMENT SYSTEM ensures that the system will be available for use whenever gaseous effluents require treatment prior to release to the environment. The requirement that the appropriate portions of these systems be used, when specified, provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable". This specification implements the requirements of 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50, and the design objectives given in Section II.0 of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the dose design objectives set forth in Sections II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents.

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.5 VENTILATION EXHAUST TREATMENT SYSTEM

BASES

The OPERABILITY of the VENTILATION EXHAUST TREATMENT SYSTEM ensures that the system will be available for use whenever gaseous effluents require treatment prior to release to the environment. The requirement that the appropriate portions of these systems be used, when specified, provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable". This specification implements the requirements of 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50, and the design objectives given in Section II.0 of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the dose design objectives set forth in Sections II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents. This control implements Technical Specification 5.5.4.f for gaseous effluents.

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.6 MARK II CONTAINMENT

BASES

This control provides reasonable assurance that releases from drywell purging operations will not exceed the annual dose limits of 10 CFR 20 for unrestricted areas.

Based on definition, VENTING would not release a volume resulting in significant contribution to gaseous plant effluents, nor resultant offsite dose. As such, there is no ODCM requirement for sampling. Sampling is required for PURGING, however, since the entire drywell volume is potentially released. Sampling prior to conducting a drywell PURGE provides a pre-release check to ensure release limits will not be exceeded, and allows for the subsequent calculation of offsite dose as a result of the drywell purge.

Once the Unit is sub-critical following shutdown, the initial 24 hour purge will exchange multiple volumes of the drywell removing the pre-existing noble gas concentration, and the lack of any source term will yield no new concentration. Likewise, there will be no source term until criticality has been achieved following startup.

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.7 Total Dose

BASES

This control is provided to meet the dose limitations of 40 CFR 190. The specification requires the preparation and submittal of a report whenever the calculated doses from plant radioactive effluents exceed twice the design objective doses of Appendix I. For sites containing up to 4 reactors, it is highly unlikely that the resultant dose to a member of the public will exceed the dose limits of 40 CFR 190 if the individual reactors remain within the reporting requirement level. The report will describe a course of action that should result in the limitation of dose to a member of the public for 12 consecutive months to within the 40 CFR 190 limits. For the purpose of the report, it may be assumed that the dose commitment to the member of the public from other uranium fuel cycle sources is negligible, with the exception that dose contributions from other nuclear fuel cycle facilities at the same site or within a radius of 5 miles must be considered. If the dose to any member of the public is estimated to exceed the requirements of 40 CFR 190, the report with a request for a variance (provided the release conditions resulting in violation of 40 CFR 190 have not already been corrected), in accordance with the provisions of 40 CFR 190.11, is considered to be a timely request and fulfills the requirements of 40 CFR 190 until NRC staff action is completed. The variance only relates to the limits of 40 CFR 190, and does not apply in any way to the requirements for dose limitation of 10 CFR Part 20, as addressed in other sections of the RECS. An individual is not considered a member of the public during any period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.8 Main Condenser

BASES

This control provides reasonable assurance that the releases from the main condenser will not exceed the requirements of the LaSalle Technical Specifications 3.7.6. In addition, a sample is required within 4 hours if the increase is not due to thermal power changes. If the cause is known and not fuel related and less than 1 hour in duration, then no sample is required. [This is based on a letter from W. R. Huntington to Operating Engineers, Shift Engineers and F.R. Lawless, dated May 24, 1984.]

B 12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

B 12.4.9 Dose Limits for MEMBERS OF THE PUBLIC

BASES

This control applies to direct exposure of radioactive materials as well as radioactive materials released in gaseous and liquid effluents. 10 CFR 20.1301 sets forth the 100 mrem/year dose limit to members of the public; 2 mrem in any one-hour limit in the unrestricted area; and reiterates that the licensee is also required to meet the 40 CFR 190 standards. 10 CFR 20.1302 provides options to determine compliance to 10 CFR 20.1301. Compliance to the above operability requirement is based on 10 CFR 20, 40 CFR 190 and LaSalle Station Technical Specification 5.5.4.g. The Effluents Program shall implement monitoring, sampling, and analysis of radioactive liquid and gaseous effluents in accordance with 10 CFR 20.1302 and with the methodology and parameters of the ODCM.

B 12.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

B 12.5.1 Radiological Environmental Monitoring Program

BASES

The Radiological Environmental Monitoring Program required by this section provides representative measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides that lead to the highest potential radiation exposures of MEMBERS OF THE PUBLIC resulting from the station operation. This monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50 and thereby supplements the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and the modeling of the environmental exposure pathways. Guidance for this monitoring program is provided by the Radiological Assessment Branch Technical Position on Environmental Monitoring. The initially specified monitoring program will be effective for at least the first 3 years of commercial operation. Following this period, program changes may be initiated based on operational experience.

The required detection capabilities for environmental sample analyses are tabulated in terms of the lower limits of detection (LLDs). The LLDs required by Table R 12.5.1-3 are considered optimum for routine environmental measurements in industrial laboratories. It should be recognized that the LLD is defined as a before the fact limit representing the capability of a measurement system and not as an after the fact limit for a particular measurement.

Detailed discussion of the LLD, and other detection limits, can be found in HASL Procedures Manual, HASL-300 (revised annually), Currie, LA., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry," Anal. Chem. 40, 586-93 (1968), and Hartwell, J.K., "Detection Limits for Radioanalytical Counting Techniques," Atlantic Richfield Hanford Company Report ARH-SA-215 (June 1975).

Table R12.5.1-1 requires "one sample of each community drinking water supply downstream of the plant within 10 kilometers." Drinking water supply is defined as water taken from rivers, lakes, or reservoirs (not well water) that is used for drinking.

B 12.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

B 12.5.2 Land Use Census

BASES

This control is provided to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the Radiological Environmental Monitoring Program given in the ODCM are made if required by the results of this census. This census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. An annual garden census will not be required since the licensee will assume that there is a garden at the nearest residence in each sector for dose calculations.

B 12.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

B 12.5.3 Interlaboratory Comparison Program

BASES

The requirement for participation in an Interlaboratory Comparison Program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive material in environmental samples matrices are performed as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are valid for the purposes of Section IV.B.2 of Appendix I to 10 CFR Part 50.

B 12.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

B 12.5.4 Meteorological Monitoring Program (NOT APPLICABLE)

OFFSITE DOSE CALCULATION MANUAL

LASALLE STATION
Units 1 and 2

1.0 INTRODUCTION - ODCM GENERAL INFORMATION

The Offsite Dose Calculation Manual (ODCM) presents a discussion of the following:

- The basic concepts applied in calculating offsite doses from plant effluents.
- The regulations and requirements for the ODCM and related programs.
- The methodology and parameters for the offsite dose calculations to assess impact on the environment and compliance with regulations.

The methodology detailed in this manual is intended for the calculation of radiation doses during routine (i.e., non-accident) conditions. The calculations are normally performed using a computer program. Manual calculations may be performed in lieu of the computer program.

The dose effects of airborne radioactivity releases predominately depend on meteorological conditions (wind speed, wind direction, and atmospheric stability). For airborne effluents, the dose calculations prescribed in this manual are based on historical average atmospheric conditions. This methodology is appropriate for estimating annual average dose effects and is stipulated in the Bases Section of the Radiological Effluents Controls (RECS).

1.1 Structure of the ODCM

Part I of the ODCM is considered to be the Radiological Effluents Controls (RECS), and contains the former Radiological Effluent Technical Specifications that have been removed from the Technical Specifications. Part I is organized as follows:

1- Definitions
2- Not Used
3- Controls
4- Surveillance Requirements
(Note: Sections 3 and 4 are presented together as 3/4)
   0. Control and Surveillance Requirements
   1. Radioactive Liquid Effluent Monitoring Instrumentation
   2. Radioactive Gaseous Effluent Monitoring Instrumentation
   3. Radioactive Liquid Effluents
   4. Radioactive Gaseous Effluents
   5. Total Dose
   6. Radiological Environmental Monitoring Program
   7. Land Use Census
   8. Inter-Laboratory Comparison Program
   9. Meteorological Monitoring Program
5- Bases
6- Administrative Requirements

Part II of the ODCM is considered to be the Offsite Dose Calculation Manual (ODCM), and contains methods, equations, assumptions, and parameters for calculation of radiation doses from plant effluents. Part II is organized as follows:

1- Introduction
2- Instrumentation and Systems
3- Liquid Effluents
4- Gaseous Effluents
5- Total Dose
6- Radiological and Environmental Monitoring Program

1.2 Regulations

This section serves to illustrate the regulations and requirements that define and are applicable to the ODCM. Any information provided in the ODCM concerning specific regulations are not a substitute for the regulations as found in the Code of Federal Regulations (CFR) or Technical Specifications.

1.2.1 Code of Federal Regulations

Various sections of the Code of Federal Regulations (CFR) require nuclear power stations to be designed and operated in a manner that limits the radiation exposure to members of the public. These sections specify limits on offsite radiation doses and on effluent radioactivity concentrations and they also require releases of radioactivity to be "As Low As Reasonably Achievable". These requirements are contained in 10CFR20, 10CFR50 and 40CFR190. In addition, 40CFR141 imposes limits on the concentration of radioactivity in drinking water provided by the operators of public water systems.

- 10CFR20, Standards for Protection Against Radiation

  This revision of the ODCM addresses the requirements of 10CFR20. The 10CFR20 dose limits are summarized in Table 1 - 1.

- Design Criteria (Appendix A of 10CFR50)

  Section 50.36 of 10CFR50 requires that an application for an operating license include proposed Technical Specifications. Final Technical Specifications for each station are developed through negotiation between the applicant and the NRC. The Technical Specifications are then issued as a part of the operating license, and the licensee is required to operate the facility in accordance with them.

  Section 50.34 of 10CFR50 states that an application for a license must state the principal design criteria of the facility. Minimum requirements are contained in Appendix A of 10CFR50.

- ALARA Provisions (Appendix I of 10CFR50)

  Sections 50.34a and 50.36a of 10CFR50 require that the nuclear plant design and the station RECS have provisions to keep levels of radioactive materials in effluents to unrestricted areas "As Low As Reasonably Achievable" (ALARA). Although 10CFR50 does not impose specific limits on releases, Appendix I of 10CFR50 does provide numerical design objectives and suggested limiting conditions for operation. According to Section I of Appendix I of 10CFR50, design objectives and limiting conditions for operation, conforming to the guidelines of Appendix I "shall be deemed a conclusive showing of compliance with the "As Low As Reasonably Achievable" requirements of 10CFR50.34a and 50.36a."

  An applicant must use calculations to demonstrate conformance with the design objective dose limits of Appendix I. The calculations are to be based on models and data such that the actual radiation exposure of an individual is "unlikely to be substantially underestimated" (see 10CFR50 Appendix I, Section III.A.1).

  The guidelines in Appendix I call for an investigation, corrective action and a report to the NRC whenever the calculated dose due to the radioactivity released in a calendar quarter exceeds one-half of an annual design objective. The guidelines also require a surveillance program to monitor releases, monitor the environment and identify changes in land use.

- 40CFR190, Environmental Radiation Protection Standards for Nuclear Power Operations

  Under an agreement between the NRC and the EPA, the NRC stipulated to its licensees in Generic Letter 79-041 that "Compliance with Radiological Effluent Technical Specifications (RETS), NUREG-0473 (Rev.2) for BWR's, implements the LWR provisions to meet 40CFR190". (See Reference 103 and 49.)

  The regulations of 40CFR190 limit radiation doses received by members of the public as a result of operations that are part of the uranium fuel cycle. Operations must be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent to any member of the public due to radiation and to planned discharges of radioactive materials does not exceed the following limits:

  - 25 mrem to the total body
  - 75 mrem to the thyroid
  - 25 mrem to any other organ

An important difference between the design objectives of 10CFR50 and the limits of 40CFR190 is that 10CFR50 addresses only doses due to radioactive effluents. 40CFR190 limits doses due to effluents and to radiation sources maintained on site. See Section 1.2.4 for further discussion of the differences between the requirements of 10CFR50 Appendix I and 40CFR190.

- 40CFR141, National Primary Drinking Water Regulations

  The following radioactivity limits for community water systems were established in the July, 1976 Edition of 40CFR141:

  - Combined Ra-226 and Ra-228: $\leq$ 5 pCi/L.
  - Gross alpha (particle activity including Ra-226 but excluding radon and uranium): $\leq$ 15 pCi/L.
  - The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 mrem/yr.

  The regulations specify procedures for determining the values of annual average radionuclide concentration that produce an annual dose equivalent of 4 mrem. Radiochemical analysis methods are also specified. The responsibility for monitoring radioactivity in a community water system falls on the supplier of the water. The LaSalle Station has requirements related to 40CFR141 in the RECS.

1.2.2 Radiological Effluent Technical Standards

The Radiological Effluent Technical Standards (RETS) were formerly a subset of the Technical Specifications. They implement provisions of the Code of Federal Regulations aimed at limiting offsite radiation dose. The NRC published Standard RETS for BWRs (Reference 3) as guidance to assist in the development of technical specifications. These documents have undergone frequent minor revisions to reflect changes in plant design and evolving regulatory concerns. The RETS have been removed from the Technical Specifications and placed in the ODCM as the RECS (see Reference 90). The RECS are similar but not identical to the guidance of the Standard Radiological Effluent Technical Specifications.

1.2.3 Offsite Dose Calculation Manual

The NRC in Generic Letter 89-01 defines the ODCM as follows (not verbatim) (see Reference 90):

> The Offsite Dose Calculation Manual (ODCM) shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Radiological Environmental Monitoring Program. The ODCM shall also contain (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs and (2) descriptions of the Information that should be included in the Annual Radiological Environmental Operating and Annual Radioactive Effluent Release Reports.

Additional requirements for the content of the ODCM are contained throughout the text of the RECS.

1.2.4 Overlapping Requirements

In 10CFR20, 10CFR50 and 40CFR190, there are overlapping requirements regarding offsite radiation dose and dose commitment to the total body. In 10CFR20.1301, the total effective dose equivalent (TEDE) to a member of the public is limited to 100 mrem per calendar year. In addition, Appendix I to 10CFR50 establishes design objectives on annual total body dose or dose commitment of 3 mrem per reactor for liquid effluents and 5 mrem per reactor for gaseous effluents (see 10CFR50 Appendix I, Sections II.A and II.B.2(a)). Finally, 40CFR190 limits annual total body dose or dose commitment to a member of the public to 25 mrem due to all uranium fuel cycle operations.

While these dose limits/design objectives appear to overlap, they are different and each is addressed separately by the RETS. Calculations are made and reports are generated to demonstrate compliance to all regulations. Refer to Table 1 - 1 and Table 1 - 2 for additional information regarding instantaneous effluent limits, design objectives and regulatory compliance.

1.2.5 Dose Receiver Methodology

Table 1 - 2 lists the location of the dose recipient and occupancy factors, if applicable. Dose is assessed at the location in the unrestricted area where the combination of existing pathways and receptor age groups indicates the maximum potential exposures. The dose calculation methodology is consistent with the methodology of Regulatory Guide 1.109 (Reference 6) and NUREG 0133 (Reference 14). Dose is therefore calculated to a maximum individual. The maximum individual is characterized as "maximum" with regard to food consumption, occupancy and other usage of the area in the vicinity of the plant site. Such a "maximum individual" represents reasonable deviation from the average for the population in general. In all physiological and metabolic respects, the maximum individual is assumed to have those characteristics that represent averages for their corresponding age group. Thus, the dose calculated is very conservative compared to the "average" (or typical) dose recipient who does not go out of the way to maximize radioactivity uptakes and exposure.

Table 1 - 1
Regulatory Dose Limit Matrix

REGULATION	DOSE TYPE		DOSE LIMIT(s)		ODCM Section
Airborne Releases:			(quarterly)	(annual)	
10CFR50 App. I[3]	Gamma Dose to Air due to Noble Gas Radionuclides (per reactor unit)		5 mrad	10 mrad	4.2.2.1
	Beta Dose to Air Due to Noble Gas Radionuclides (per reactor unit)		10 mrad	20 mrad	4.2.2.2
	Organ Dose Due to Specified Non-Noble Gas Radionuclides (per reactor unit)		7.5 mrem	15 mrem	4.2.3
	Total Body and Skin Dose (if air dose is exceeded)	Total Body	2.5 mrem	5 mrem	4.2.2.3
		Skin	7.5 mrem	15 mrem	4.2.2.4
Technical Specifications	Total Body Dose Rate Due to Noble Gas Radionuclides (instantaneous limit, per site)		500 mrem/yr		4.2.1.1
	Skin Dose Rate Due to Noble Gas Radionuclides (instantaneous limit, per site)		3,000 mrem/yr		4.2.1.2
	Organ Dose Rate Due to Specified Non-Noble Gas Radionuclides (instantaneous limit, per site)		1,500 mrem/yr		4.2.1.3
Liquid Releases:			(quarterly)	(annual)	
10CFR50 App. I[3]	Whole (Total) Body Dose (per reactor unit)		1.5 mrem	3 mrem	3.4
	Organ Dose (per reactor unit)		5 mrem	10 mrem	3.4
Technical Specifications	The concentration of radioactivity in liquid effluents released to unrestricted areas		Ten times the values listed in 10CFR20 Appendix B; Table 2, Column 2, and in note 5 below for Noble Gases		3.2
Total Doses [1]:					
10 CFR 20.1301 (a)(1)	Total Effective Dose Equivalent [4]		100 mrem/yr		5.2
10CFR20.1301 (d) And 40CFR190	Total Body Dose		25 mrem/yr		5.2
	Thyroid Dose		75 mrem/yr		5.2
	Other Organ Dose		25 mrem/yr		5.2
Other Limits [2]:					
40CFR141	Total Body Dose Due to Drinking Water From Public Water Systems		4 mrem/yr		3.4
	Organ Dose Due to Drinking Water From Public Water Systems		4 mrem/yr		3.4

1 These doses are calculated considering all sources of radiation and radioactivity in effluents.

2 These limits are not directly applicable to nuclear power stations. They are applicable to the owners or operators of public water systems. However, the LaSalle RECS requires assessment of compliance with these limits.

3 Note that 10CFR50 provides design objectives, not limits.

4 Compliance with 10CFR20.1301(a)(1) is demonstrated by compliance with 40CFR190. Note that it may be necessary to address dose from on-site activity by members of the public as well.

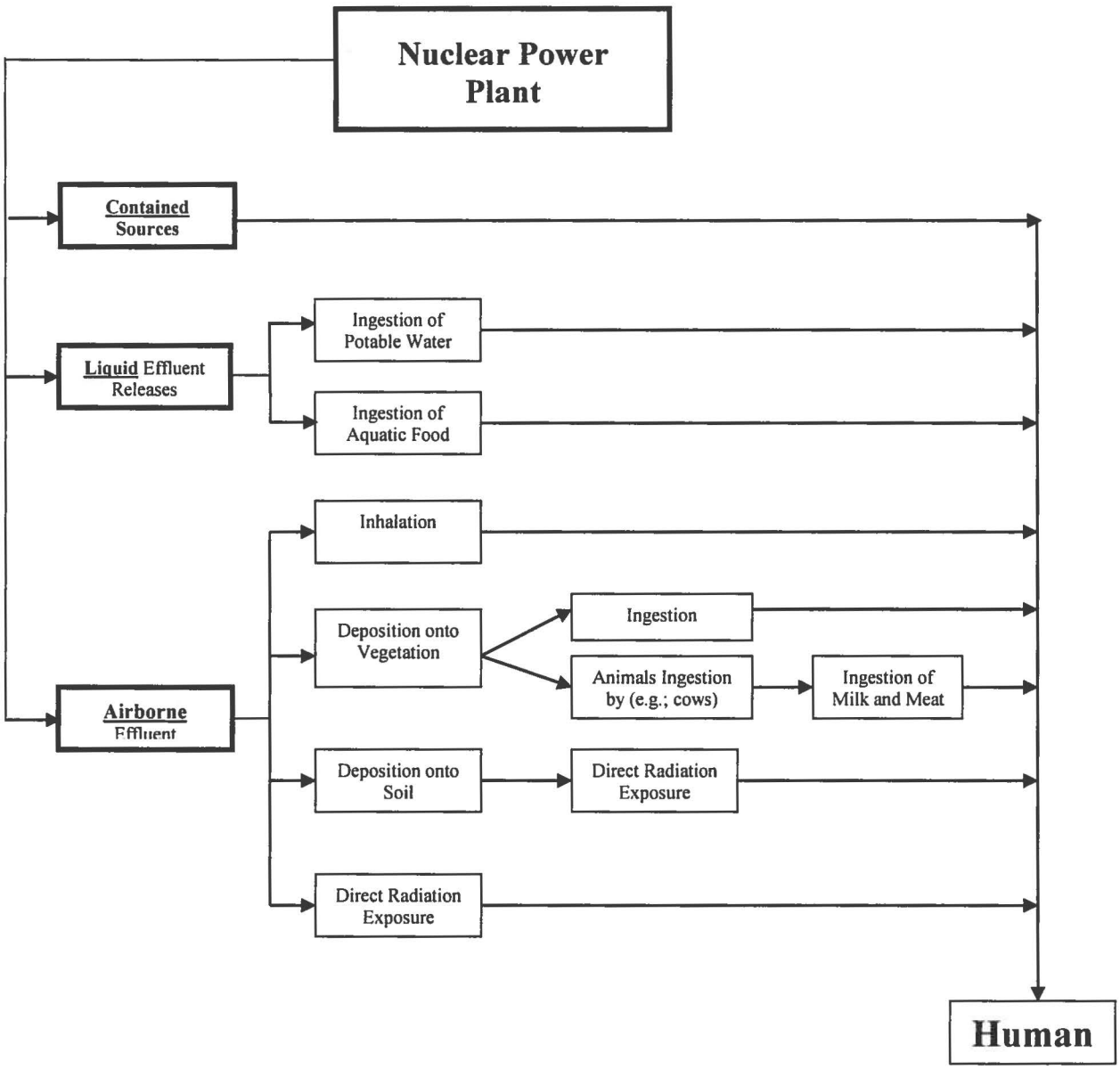
5 Kr-85m, Kr-85, Kr-87, Kr-88, Ar-41, Xe-131m, Xe-133m, Xe-133, Xe-135m and Xe-135 allowable concentration is 2E-4, 5E-4, 4E-5, 9E-5, 7E-5, 7E-4, 5E-4, 6E-4, 2E-4 and 2E-4 μCi/ml, respectively, computed from Equation 17 of ICRP Publication 2 adjusted for infinite cloud submersion in water, and R = 0.01 rem/wk, ρ_w = 1.0 g/cm3, and P_w/P_t = 1.0.

Table 1 - 2
Dose Assessment Receivers

Dose Component or Pathway	Location; Occupancy if Different than 100%
"Instantaneous" dose rates from airborne radioactivity	Unrestricted area boundary location that results in the maximum dose rate
"Instantaneous" concentration limits in liquid effluents	Point where liquid effluents enter the unrestricted area
Annual average concentration limits for liquid effluents	Point where liquid effluents enter the unrestricted area
Direct dose from contained sources	Receiver spends part of this time in the controlled area and the remainder at his residence or fishing nearby; occupancy factor is considered and is site-specific.
Direct dose from airborne plume	Receiver is at the unrestricted area boundary location that results in the maximum dose.
Dose due to radioiodines, tritium and particulates with half-lives greater than 8 days for inhalation, ingestion of vegetation, milk and meat, and ground plane exposure pathways.	Receiver is at the location in the unrestricted area where the combination of existing pathways and receptor age groups indicates the highest potential exposures.
Ingestion dose from drinking water	The drinking water pathway is considered as an additive dose component in this assessment only if the public water supply serves the community immediately adjacent to the plant.
Ingestion dose from eating fish	The receiver eats fish from the receiving body of water
Total Organ Doses	Summation of ingestion/inhalation doses
Total Dose	Summation of above data (Note it may also be necessary to address dose from on-site activity by members of the public.)

Figure 1 - 1 illustrates some of the potential radiation exposure pathways to humans due to routine operation of a nuclear power station.

Figure 1 - 1
Radiation Exposure Pathways to Humans



1.3 Offsite Dose Calculation Parameters

This section contains offsite dose calculation parameter factors, or values not specific only to one of the gas, liquid, or total dose chapters. Additional parameters are provided in the Sections 2, 4 and 5 of the ODCM.

10CFR50 Dose Commitment Factors

With the exception of H-3, the dose commitment factors for 10CFR50 related calculations are exactly those provided in Regulatory Guide 1.109 (Reference 6). The following table lists the parameters and the corresponding data tables in the RG 1.109:

PATHWAY	ADULT	TEENAGER	CHILD	INFANT
Inhalation	RG 1.109: Table E-7	RG 1.109: Table E-8	RG 1.109: Table E-9	RG 1.109: Table E-10
Ingestion	RG 1.109: Table E-11	RG 1.109: Table E-12	RG 1.109: Table E-13	RG 1.109: Table E-14

These tables are contained in Regulatory Guide 1.109 (Reference 6). Each table (E-7 through E-14) provides dose factors for seven organs for each of 73 radionuclides, and Table E-5 lists Miscellaneous Dose Assessment Factors - Consumption Parameters. For radionuclides not found in these tables, dose factors will be derived from ICRP 2 (Reference 50) or NUREG-0172 (Reference 51). The values for H-3 are taken from NUREG-4013 (Reference 107).

1.4 References

The references listed below were transferred from the previous ODCM revision that was common to all former Commonwealth Edison nuclear stations. The references not applicable to LaSalle Station have been deleted, however the numbering has been preserved for ease of reference management throughout the ODCM document; therefore, reference numbering is not sequential.

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