August 16, 2005

MEMORANDUM TO: Eileen Mckenna, Acting Program Director
Financial, Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

FROM: Clayton L. Pittiglio **/RA/**
Financial, Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

SUBJECT: SUMMARY OF AUGUST 8, 2005, PUBLIC MEETING ON RADIATION PROTECTION PROGRAM GUIDELINES FOR A COMBINED OPERATING LICENSE APPLICATION UNDER 10 CFR PART 52

On August 8, 2005, Nuclear Regulatory Commission (NRC) staff met with a representative of the Nuclear Energy Institute (NEI) and industry in a public meeting at NRC headquarters in Rockville, Maryland, to discuss radiation protection issues that an applicant would need to address when applying for a Combined Operating License (COL) under 10 CFR Part 52. Attachment 1 is a list of meeting attendees. Attachment 2 provides a draft of Section 12. 5, "Radiation Protection Program" This section is intended to be used as part of the guidelines for a COL application and will be input for NEI 04-01.

Ralph Andersen, of NEI, presented the draft sections and explained what each section was intended to accomplish. The staff agreed with the material in general and provided comments and points of clarification to be added to the sections. The attached draft redline/strikeout version reflects the comments that NRC provided at the meeting.

The group answered comments from those on teleconference and, as there were no public comments, the meeting was adjourned.

Project No. 689
Attachments: As stated

August 16, 2005

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Financial, Policy and Rulemaking Program
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Ralph Andersen, of NEI, presented the draft sections and explained what each section was intended to accomplish. The staff agreed with the material in general and provided comments and points of clarification to be added to the sections. The attached draft redline/strikeout version reflects the comments that NRC provided at the meeting.

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Distribution: Summary of Mtg. w/NEI regarding RP COL applications 6/16/05
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List of Attendees for August 8, 2005
Meeting on Radiation COL Issues

NAME	ORGANIZATION
Roger Pedersen	NRC\DIPM\IPSB
Charles Hinson	NRC\DIPM\IPSB
Clayton L. Pittiglio	NRC\DRIP\RPRP
Kirsi Alm-Lytz	NRC\NRR-STUK
Ralph Andersen	Nuclear Energy Institute
Richard Getz*	Framatome ANP

* via telecon

Attachment 1

12.5 Radiation Protection Program

A radiation protection program is developed, documented, and implemented commensurate with the scope and extent of licensed activities, sufficient to ensure compliance with the provisions of 10 CFR Parts 19, 20, 50, and 71 and consistent with the guidance in Regulatory Guides 1.8, 1.33, 8.2, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.13, 8.15, 8.20, 8.26, 8.27, 8.28, 8.29, 8.32, 8.34, 8.35, 8.36, and 8.38 and the consolidated guidance in NUREG-1736.

The purpose of the radiation protection program is to maintain occupational and public doses below regulatory limits and as low as reasonably achievable (ALARA). To achieve this, the program will include:

1. a documented management commitment to keep exposures ALARA;

2. a trained and qualified organization with sufficient authority and well-defined responsibilities; and

3. adequate facilities, equipment, and procedures to effectively implement the program.

The radiation protection program is implemented in stages consistent with the following milestones such that the radiation protection program are fully implemented prior to initial loading of fuel in the reactor:

1. Initial receipt of licensed radioactive sources.

2. Initial receipt of new reactor fuel.

3. Initial loading of fuel in the reactor.

The radiation protection program content and effectiveness of implementation are reviewed periodically (at least annually) as part of an ongoing quality assurance program consistent with the guidance in Regulatory Guide 1.33.

12.5.1 Management Policy

Plant management will issue written policy on radiation protection that is consistent with the guidance in Regulatory Guides 8.8 and 8.10, including management's commitment to:

1. Assure that the plant is designed, constructed, and operated such that occupational and public radiation exposures and releases of licensed radioactive materials are ALARA;

2. Comply with regulatory radiation requirements, dose limits, and limits on release of radioactive materials;

3. Implement and maintain a radiation protection program to keep radiation doses below regulatory limits and ALARA;

4. Assure that each manager and supervisor in the plant organization understands and is held accountable for implementing his or her responsibility to integrate appropriate radiation protection controls into work activities;

5. Assure that each individual working at the facility understands and accepts the responsibility to follow radiation protection procedures and instructions provided by radiation protection staff and to maintain his or her dose ALARA;

6. Provide the radiation protection manager the delegable authority to stop work or order an area evacuated (in accordance with approved procedures) when, in his or her judgment, the radiation conditions warrant such an action and such actions are consistent with plant safety;

7. Establish a direct reporting chain of the Radiation Protection Manager to the Plant Manager that is independent of the reporting chains for Operations and Maintenance.

.[Note: As appropriate to the planned site-specific organization, consider adding the following item to Plant Manager responsibilities to clarify how line organization responsibilities will be carried out:

8. Establish an ALARA committee made up of the heads of Operations, Maintenance, Engineering, Radiation Protection and other organizational units as needed to help assure effective implementation of line organization ALARA responsibilities.]

~~As an option for clarifying typical organization echanism used n option for clarifying how the Plant Manager will assure that line organization ALARA responsibilities are carried stablishes an ALARA Committee, made up of at least the heads of Operations, Maintenance, Engineering and Radiation Protection, with sufficient delegated authority to help assure effective implementation of line organization responsibilities for maintaining worker doses ALARA.~~

12.5.2 Organization

Qualification and training criteria for site personnel are consistent with the guidance in Regulatory Guide 1.8 and are described in FSAR Section 13. Specific radiation protection responsibilities for key positions within the plant organization are described below.

12.5.2.1 Plant Manager

The Plant Manager will have overall responsibility for the safe operation of the plant, including the responsibility for occupational and public radiation safety. Radiation protection responsibilities of the Plant Manager are consistent with the guidance in Regulatory Guides 8.8 and 8.10, including the following:

1. Ensure implementation of management radiation protection policy throughout the plant organization;

2. Ensure the overall commitment to radiation protection by the plant organization;

3. Interact with and support the Radiation Protection Manager on implementation of the radiation protection program;

4. Support identification and implementation of cost-effective modifications to plant equipment, facilities, procedures and processes to improve radiation protection controls and reduce exposures;

5. Establish plant goals and objectives for radiation protection;

6. Assure that exposures to site personnel are maintained ALARA;

7. Support timely identification, analysis and resolution of radiation protection problems (e.g., through the plant corrective action program);

8. Assure that site personnel are properly trained on radiation protection in accordance with 10 CFR Part 19.

[Note: Consider the following option for providing a means to helping assure effective implementation of line organization responsibilities fior maintaining worker doses ALARA:

9. Establish an ALARA Committee with delegated authority from the Plant Manager that includes, at a minimum, the managers of Operations, Maintenance, Engineering and Radiation Protection to help assure effective implementation of line organization responsibilities for maintaining worker doses ALARA.]

12.5.2.2 Plant Organizational Managers and Supervisors

Managers and supervisors within the plant organization are responsible for establishing goals and expectations for his or her organization and to reinforce behaviors that promote radiation protection. Specifically, managers and supervisors are responsible for the following, as applicable to their position within the plant organization:

1. Interface directly with radiation protection staff to assure that radiation protection measures are considered and integrated into plant procedures and design documents and into the planning, scheduling, conduct, and assessment of operations and work;

2. Notify radiation protection personnel promptly when radiation protection problems occur or are identified, take corrective actions, and resolve deficiencies associated with operations, procedures, systems, equipment, and work practices.

3. Ensure that site personnel receive training on radiation protection, and are periodically retrained, in accordance with 10 CFR Part 19 and are properly instructed and briefed for entry into restricted areas.

4. Periodically observe and correct, as necessary, radiation worker practices;

5. Support the RPM in implementing the radiation protection program.

6. Assure that exposures to site personnel are maintained ALARA.

12.5.2.3 Radiation Protection Manager

The Radiation Protection Manager (RPM) will have the direct responsibility for assuring adequate protection of the health and safety of personnel working at the plant and members of the public during all aspects of activities covered within the scope and extent of the license. Qualifications and experience of the RPM are consistent with Regulatory Guide 1.8. Radiation protection responsibilities of the RPM are consistent with the guidance in Regulatory Guides 8.8 and 8.10, including the following:

1. Manage the radiation protection organization;

2. Establish, implement, and enforce the radiation protection program;

3. Provide radiation protection input to facility design and work planning;

4. Track and analyze trends in radiation work performance and take necessary actions to correct adverse trends;

5. Support the plant emergency preparedness program and assign emergency duties and responsibilities within the radiation protection organization;

6. Delegate authority to appropriate radiation protection staff to stop work or order an area evacuated (in accordance with approved procedures) when, in his or her judgment, the radiation conditions warrant such an action and such actions are consistent with plant safety;

12.5.2.4 Radiation Protection Technicians

Radiation protection technicians (RPTs) will directly carry out responsibilities defined in the radiation protection program and procedures. RPTs will perform the major portion of the radiation protection work for the station. At least one RPT is supplied onsite to each operating shift at all times commencing with initial loading of fuel in the reactor.

The qualifications and experience of RPTs are consistent with the guidance Regulatory Guide 1.8. RPTs are trained and qualified under a program that is established, implemented and maintained in accordance with 10 CFR 50.120. As assigned by the RPM or radiation protection supervisory staff, RPTs are trained and qualified to implement specific radiation protection responsibilities, including the following:

Some of the responsibilities listed below may be assigned to trained and qualified staff in Radiation Protection other than RPTs (e.g., a health physicist or a radiological engineer) or to trained and qualified staff assigned to another department.

1. As delegated authority by the RPM, stop work or order an area evacuated (in accordance with approved procedures) when, in his or her judgment, the radiation

conditions warrant such an action and such actions are consistent with plant safety;

2. Provide coverage and monitor radiation conditions for jobs potentially involving significant radiation exposure;

3. Conduct surveys, assess radiation conditions and establish radiation protection requirements for access to and work within restricted, radiation, high radiation, very high radiation, airborne radioactivity areas, and areas containing radioactive materials;

4. Identify, post, and establish appropriate controls for access to restricted, radiation, high radiation, very high radiation, airborne radioactivity areas, and areas containing radioactive materials;

5. Provide control over the receipt, storage, movement, use, and shipment of licensed radioactive materials;

6. Maintain, operate, and calibrate fixed and portable equipment and instrumentation for monitoring or taking samples to assess levels of radiation, radioactivity, and/or dose;

7. Perform monitoring and assessment of radioactivity in solid radioactive waste, effluents and in the plant environs;

8. Review work packages, proposed design modifications, and operations and maintenance procedures to ensure integration of adequate radiation protection controls and dose-reduction measures;

9. Review and oversee implementation of plans for the use of temporary shielding or other engineered radiation protection controls to minimize dose rates;

10. Review and oversee implementation of plans for the use of process or other engineering controls to limit the concentrations of radioactive materials in the air

11. Provide personnel monitoring and bioassay services;

12. Maintain, prescribe and oversee the use of respiratory protection equipment;

13. Perform assigned emergency response duties.

12.5.2.5 Radiation Protection Supervisory and Technical Staff

Radiation protection supervisory and technical staff are included within the radiation protection organization as needed to support the RPM in carrying out his or her assigned duties and responsibilities and to oversee and support the work of the RPTs. A specific supervisor or technical staff member, knowledgeable in the respective functional area and trained and qualified consistent with the guidance in Regulatory Guide 1.8, is assigned

overall responsibility for each of the following functional areas (one individual may be responsible for more than one functional area):

Responsibility for some of the functional areas listed below may be assigned outside of the RP department. However, the criteria for experience, training and qualification of staff responsible for the program will remain as described above.

1. Respiratory Protection

2. Personnel Dosimetry

3. Bioassay

4. Instrument Calibration and Maintenance

5. Radioactive Source Control

6. Effluents and Environmental Monitoring and Assessment

7. Radioactive Waste Shipping

8. Radiation Work Permits

9. Job Coverage

10. Radiation Monitoring and Surveys

12.5.3 Facilities, Instrumentation and Equipment

Adequate facilities, instrumentation and equipment ~~will be~~are provided to support implementation of the radiation protection program during routine operations, refueling and other outages, abnormal occurrences, and accident conditions. The types and characteristics of facilities, instrumentation, and equipment provided ~~will be~~are consistent with the guidance in Regulatory Guides 1.97, 8.2, 8.4, 8.6, 8.8, 8.9, 8.10, 8.15, 8.20, 8.26, 8.28, and 8.32 and the criteria in NUREG-0737, Items II.B.3 and III.D.3.3.

12.5.3.1 Facilities

[Note: Facilities that were previously described and reviewed in an applicable design control document (DCD) need not be included in this section of the FSAR.]

[Note: Based on company and site-specific information, the section below may~~should~~ be modified to indicate~~clarify which~~ facilities and functions that may be carried out at another location or through a vendor.~~located offsite at another company facility or carried out through a vendor~~.]

Radiochemistry Laboratory

The radiochemistry laboratory facility ~~will be~~are centrally located for receiving, storing, preparing, analyzing, and disposing of solid, liquid, and gaseous sample media. The facility will contain at least one floor drain, sink, fume hood, cabinet with worktop, storage locker, and emergency shower/eyewash system. Drains ~~will be~~are piped to the chemical waste collection system and/or the liquid radioactive waste system. The fume hood will exhaust to a monitored building ventilation exhaust system.

The facility will include a counting room for analyzing samples. The counting room is~~will be~~ equipped with instrumentation capable of analyzing the various types of samples generated as a result of plant operations, refueling and other outages, abnormal occurrences, and accidents. Counting room instrumentation will include a gamma spectroscopy system, liquid scintillation counter, low-background proportional counter or scintillation counter, and other counting instrumentation such as an end-window Geiger-Mueller (GM) counter.

The laboratory/counting room facility and instrumentation ~~will be~~are sufficiently shielded to maintain low background radiation levels to permit analysis of samples during routine and accident conditions. The configuration of the facility and instrumentation will assure the capability of being able to analyze reactor coolant and containment atmosphere samples obtained under accident conditions consistent with the guidance in NUREG-0737, Item II.B.3.

Access Control Facility

Access control facilities ~~will be~~are provided to control the entrance and exit of personnel and materials into and from the radiologically-controlled area (RCA) of the plant. Separate change areas for male and female personnel ~~will be~~are located at the access control facility. The change areas ~~will be~~are sufficiently sized to support both routine and typical refueling outage conditions. In addition, the capability ~~will be~~is available to set up alternate access control points and change facilities on a temporary basis as necessary to support abnormally large-scale outages, both at access points to the RCA, as well as secondary access points within the plant (e.g., for control of access to the refueling area or the containment).

Personnel Decontamination Area

A personnel decontamination area is~~will be~~ established near the primary access control facility. The personnel decontamination area is~~will be~~ supplied with sinks and showers with drains that are routed to the liquid radioactive waste system. The personnel decontamination area will include a supply of cleaning agents, decontamination supplies, and a first aid kit.

Radiation Protection Offices

Radiation protection offices sufficient to support staff oversight of access to the RCA ~~will be~~are located near the RCA access control point(s). Radiation protection offices sufficient to house the staff and support radiation protection responsibilities ~~will be~~are provided at a location(s) suitable for carrying out those responsibilities. The offices will include furnished areas for radiation protection staff to perform administrative work,

maintain files, etc. Space will also be provided for storage and issuance of radiation protection equipment, instrumentation, dosimetry, and supplies.

Portable-Instrument Calibration Facility

A portable instrument calibration facility is~~will be~~ designed and located such that radiation fields created during calibrations will not unnecessarily expose personnel and will not interfere with low-level monitoring or counting systems. This facility is~~will be~~ situated in a low background radiation area so that ambient radiation fields from plant operation will not interfere with low-range instrument calibrations.

Respirator Facility

A facility is~~will be~~ established for respirator inventory, inspection, storage, maintenance, repair, control and issuance consistent with the guidance in Regulatory Guide 8.15. Adequate standards of housekeeping and cleanliness ~~will be~~are maintained within the respirator facility to efficiently perform these functions. When not in use, the facility is~~will be~~ secured to maintain positive control over the issuance of respiratory protection devices. Only non-contaminated respirators ~~will be~~are serviced in the respirator facility. Used/contaminated respirators ~~will be~~are decontaminated and cleaned in the Equipment Decontamination Facility prior to being brought to the Respirator Facility.

Equipment Decontamination Facility

Decontamination and cleaning of personnel protective equipment, instrumentation, and small items ~~will be~~are performed in a facility set up for that specific purpose. The facility ~~will be~~is supplied with special equipment and features to accomplish effective decontamination without spreading contamination outside the facility. Wash-down area and sink drains are routed to the liquid radioactive waste system and positive air flow is maintained into the decontamination facility and exhausted into a monitored building ventilation system. The facility is~~will be~~ provided with coated walls and floors to help assure ease of cleanup and decontamination. Vendor-supplied services may also be utilized for equipment decontamination and cleaning.

Machine Shop for Activated/Contaminated Components and Equipment

A facility is~~will be~~ provided for receiving, disassembling, repairing and machining activated or contaminated components and equipment so as to control the spread of contamination.

Storage and Issue Area for Contaminated Tools and Equipment

A facility is~~will be~~ provided for the control, storage, issuance and receipt of contaminated tools and equipment so as to minimize the generation of radioactive waste and control the spread of contamination.

Radioactive Materials Storage Area

A radioactive materials storage area is~~will be~~ established that provides for secure storage of licensed radioactive materials to prevent unauthorized removal or access.

Facility for Dosimetry Processing and Bioassay

A facility or facilities are provided to support processing of dosimetry and conduct of bioassay, including *in-vivo* and *in-vitro* bioassay. As applicable, the facility for dosimetry processing are apparopriate for obtaining and maintaining acceditation under the National Voluntary Laboratory Accreditation Program (NVLAP) for dosimetry processing in accordance with 10 CFR 20.1501(c). The facility for in-vivo bioassay, e.g., whole body counting, are designed and configured to allow for low background counting sufficient to meet range and sensitivity criteria consistent with the guidance in Regulatory Guides 8.9 and 8.26. The facility for in-vivo bioassay will allow for the collection, processing, storage and shipment of samples for analysis.

Laundry Facility

A facility are provided for the receipt, storage, cleaning, laundering, and monitoring of contaminated personnel protective clothing and equipment. Gaseous and liquid effluents resulting from the laundering process are directed through release points that are processed, monitored, and controlled to assure that resulting radiation doses are less than the applicable limits in 10 CFR Parts 20 and 50 and as low as reasonably achievable (ALARA). Radioactive wastes resulting from the laundering and cleaning processes be collected and properly disposed of in accordance with the requirements in 10 CFR 20, Subpart K.

12.5.3.2 Monitoring Instrumentation and Equipment

Radiation monitoring instrumentation and equipment ~~will be~~are selected, maintained and used to provide the appropriate detection capabilities, ranges, sensitivities and accuracies required for the types and levels of radiation anticipated at the plant and in the environs during routine operations, major outages, abnormal occurrences, and postulated accident conditions. The quantities of instrumentation and equipment ~~will be~~are sufficient to meet the anticipated needs of the plant during all anticipated conditions –taking into account the amount of instrumentation and equipment that may be unavailable at any one time due to periodic testing and calibration, maintenance, and repair.

The types and nominal characteristics of the instrumentation are as follows:

Laboratory and Fixed Instrumentation

11. Multi-channel gamma analysis system to identify and measure gamma emitting radionuclides in solid, liquid and gaseous samples. Some of the sample types analyzed include primary reactor coolant, liquid and gaseous waste and airborne contaminants.

12. Automatic and manual GM counters to measure gross beta and gamma activity.

13. A low background proportional counter to detect and measure gross alpha activity.

14. A liquid scintillation counter is to measure tritium in liquid and gaseous samples.

15. A whole-body counter to detect and quantify personnel intakes of radioactivity.

16. Fixed instrumentation, such as small article monitors, hand and foot monitors, and portal monitors, to monitor for contamination on personnel, materials, and equipment.

Portable Monitoring Instrumentation and Equipment (nominal ranges are given in parentheses for illustrative purposes only)

1. Beta-gamma GM count rate survey meters (0-50,000cpm) to detect radioactive contamination on surfaces and for low level exposure rate measurements.

2. Low-range (0-50 mR/hr) and high range (0-1,000 R/hr) beta-gamma GM survey meters and ion chamber survey meters (0-50 R/hr) are used to measure the full range of dose rates necessary for radiation protection purposes during routine operations, abnormal occurrences and accidents.

3. Ion chamber beta-gamma survey meters (0-10,000 R/hr) to monitor the plant and environs during and following an accident.

4. Scintillation or proportional count rate meters (0-500,000 cpm) to monitor directly for alpha activity.

5. Neutron survey instruments (0-5rem/hr) to measure neutron dose rates for radiation protection purposes.

6. High and low volume air samplers equipped with appropriate filter media are used to take grab samples that are analyzed to assess airborne radioactivity concentrations, estimate actual or potential exposure, and to determine respiratory protection measures.

7. Continuous air monitors (CAMs) provide the means to observe trends in airborne radioactivity concentrations. CAMs equipped with local alarm capability are used in occupied areas where needed to alert personnel to sudden changes in airborne radioactivity concentrations.

8. Hand-held friskers to detect radioactive contamination.

9. Portable air sampling and analysis system to determine airborne radioiodine concentrations during and following an accident consistent with the criteria in NUREG-0737, Item III.D.3.3.

Personnel Monitoring Instrumentation and Equipment

1. Individual personnel dosimeters to measure gamma, beta and neutron radiation dose with sensitivities and ranges appropriate to measure the expected levels and types of radiation.

2. Direct-reading dosimeters to provide real-time gamma dose information with sensitivities and ranges appropriate to measure the expected levels and types of radiation.

3. Special dosimeters to monitor extremity dose with sensitivities and ranges appropriate to measure the expected levels and types of radiation.

4. Personnel air samplers to monitor individual exposure to airborne radioactivity.

12.5.3.3 Personnel Protective Clothing and Equipment

A sufficient inventory of serviceable personnel protective clothing and equipment ~~will be~~is maintained for use during plant operations, refueling and other outages, abnormal conditions, and accidents. Only respirators that are tested and certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA), or otherwise approved by the NRC, ~~will be~~are used. [Note: The applicant may wish to include sufficient information with the application to allow the NRC to consider approval of special use respirator filters (e.g., iodine canisters) and disposable supplied-air suits in accordance with the requirements in 10 CFR Parts 20.1703(b) and 20.1705.]

Personnel protective clothing and equipment will include the following:

1. Anti-contamination clothing for both dry and wet work conditions, including heat stress reduction accessories

2. Head covers, shoe covers, gloves, and safety-related items.

3. Full facemask respirators with high-efficiency particulate and charcoal filters.

4. Pressure demand full facemask air line respirators.

5. Pressure demand full facemask self-contained breathing apparatus

6. ~~Special use respirator filters (e.g., iodine filter cartridges)~~

7. ~~Disposable supplied-air suits.~~

12.5.3.4 Other Protective Equipment

1. Portable ventilation systems with HEPA filters

2. Temporary containments, tents, and enclosures

3. Heat-stress reduction equipment

4. Vacuums with HEPA filters

5. Portable liquid filtration equipment

6. Temporary shielding

12.5.4 Procedures

Radiation protection procedures ~~will be~~are established, implemented and maintained sufficient to provide adequate control over the receipt, possession, use, transfer, and disposal of byproduct, source, and special nuclear material and assure compliance with applicable requirements in 10 CFR Parts 19, 20, 50, 70, and 71. Procedures for radiation protection ~~will be~~are prepared consistent with the guidance in Regulatory Guides 1.8, 1.33, 8.2, 8.7, 8.8 and 8.10 and guidance referenced in NUREG-1736 that is applicable to power reactors. The procedures ~~will be~~are implemented by Radiation Protection staff trained and qualified in accordance with the requirements in 10 CFR 50.120 and consistent with the guidance in Regulatory Guide 1.8. Some procedures are implemented by plant staff trained in accordance with the requirements of 10 CFR 19.12 and consistent with the guidance in Regulatory Guides 8.13, 8.27, and 8.29.

12.5.4.1 Radiological Surveillance

Radiological surveillance procedures ~~will~~ comply with 10 CFR 20.1501 and ~~will be~~are consistent with the guidance in Regulatory Guides 8.2, 8.8, and 8.10.

Trained and qualified radiation protection staff will routinely survey accessible areas in the plant and environs to assess the presence and levels of radiation, radioactive contamination, and airborne radioactivity. The instrumentation and techniques used for these surveys ~~will be~~are selected based upon the purpose of the survey and the anticipated types and levels of radiation and radioactivity involved. Surveys ~~will be~~are performed using effective practices to minimize personnel exposure and avoid the spread of contamination.

The frequency and extent of the surveys will depend upon several factors, such as location, actual or potential radiation levels, plant operational status and work in progress, and accessibility/occupancy. The frequency of surveys may be weekly, monthly, quarterly, semiannually, annually, or as directed by the Radiation Protection Manager. Surveys ~~will be~~are performed more frequently in accessible areas subject to changes in radiological conditions.

Survey results ~~will be~~are recorded and maintained in accordance with the requirements in 10 CFR 20. Survey results for accessible areas ~~will be~~are posted or otherwise made available to provide adequate notice to workers of radiological conditions.

Radiation surveys ~~will be~~are routinely performed for detection of beta and gamma radiation. Surveys for neutron radiation ~~will be~~are performed in accessible areas where such radiation may be present.

Area contamination surveys ~~will be~~are routinely performed for the detection of removable and fixed beta-gamma contamination. Surveys for alpha contamination ~~will be~~are performed where alpha contamination is anticipated. Alpha contamination surveys will also be performed periodically as a check to verify that alpha contamination is not present.

Personnel will monitor themselves for contamination after exiting from contaminated areas and at exit points from the RCA or other Restricted Areas with a potential for contamination. Materials and equipment ~~will be~~are monitored for contamination after removal from contaminated areas and prior to being released from the RCA or other Restricted Areas with a potential for contamination.

Surveys to assess airborne radioactivity levels ~~will be~~are performed with continuous air monitors (CAMs) and by taking grab samples (using portable low or high volume air samplers) with appropriate media for collecting particulate, iodine, gas, or tritium samples. In order to warn personnel of changing airborne conditions, CAM alarm set points ~~will be~~are set at a fraction of the concentration values given in 10CFR20 Appendix B, Table 1, Column 3 for radionuclides expected to be encountered. Air monitoring and sampling ~~will be~~are sufficient to identify the potential hazard(s), determine the need for and verify the effectiveness of process and engineering controls, permit proper selection of respiratory protection equipment, and estimate doses from intakes.

~~Survey requirements for detecting a criticality event will be met in accordance the requirements in 10 CFR 70.24 or 10 CFR 50.68. Radiation monitors, as required by General Design Criterion (GDC) 63 of 10 CFR 50 are provided in storage and associated handling areas when fuel is present to detect excessive radiation levels and to initiate appropriate safety action.~~

Emergency operating procedures will include provisions for use of a portable monitoring system, consistent with the criteria in NUREG-0737, Item III.D.3.3, to sample and analyze for radioiodine in areas of the plant during and following an accident. Procedures will include methods for taking and analyzing samples in the field, as well as for analyzing samples in the count room facility, accounting for techniques to reduce counting system saturation from a high-activity sample.

Instrumentation and equipment used to perform surveys ~~will be~~are calibrated prior to initial use, after performance of maintenance or repairs that might affect the calibration, and at least annually. Operational checks to test function or response ~~will be~~are made daily for continuously operating instrumentation and equipment (e.g., friskers, portal monitors, and continuous air monitors) and prior to use or daily, whichever is less

frequent, for other instrumentation and equipment. Operational checks ~~will be~~are performed for emergency and special use instrumentation and equipment on a regular schedule as specified in written procedures.

Survey records and records of calibration and maintenance of instrumentation and equipment used for surveys ~~will be~~are documented and maintained in accordance with applicable requirements in 10 CFR 20.2101-20.2110.

12.5.4.2 Posting and Labeling

Procedures for posting and labeling will assure compliance with 10 CFR 20.1901, 20.1902, 20.1903, 20.1904, and 20.1905.

Based on current survey results, Radiation Areas, High Radiation Areas, Very High Radiation Areas, Airborne Radioactivity Areas, and Radioactive Materials Areas ~~will be~~are posted in accordance with the requirements in 10 CFR 20.1901, 20.1902, and 20.1903. Containers of licensed radioactive materials ~~will be~~are labeled in accordance with 10 CFR 20.1904 and 20.1905.

Criteria and procedures ~~will be~~are established for posting areas and marking items (e.g. tools and equipment) to indicate the presence of fixed or removable surface contamination. Areas posted to indicate the presence of removable contamination, referred to hereafter as "Contamination Areas."

"Posted areas," as used in section 12.5 of this FSAR, refers to Radiation Areas, High Radiation ~~Aracs~~Areas, Very High Radiation Areas, Airborne ~~Radioactivitiy~~Radioactivity Areas, Contaminated Areas, and Radioactive Materials Areas.

12.5.4.3 Access Control

Procedures for access control will assure compliance with 10 CFR 20.1902, 20.1903, 20.1601, and 20.1602 and ~~will be~~are consistent with the guidance in Regulatory Guide 8.38.

Access to posted areas is~~will be~~ restricted and controlled, at a minimum, through the use of instructions to workers, radiation work permits, caution signs, and barriers. Access to High and Very High Radiation Areas is~~will be~~ controlled consistent with the guidance in Regulatory Guide 8.38, including the use alternative methods for access control as described in the regulatory guide and specified in plant technical specifications.

[Note: This section should describe each Very High Radiation Area and refer to its location on plant layout diagrams in Sections 12.3-4. This section should also include a description of the additional administrative controls for restricting access to each Very High Radiation Area as required by 10 CFR 20.1903. Sections 12.3-~~4 should~~4 should include detailed drawings showing isometric views of each Very High Radiation Area and indicate physical access controls and radiation monitor locations for each area. .]

Unescorted access to Radiation Areas or Radioactive Materials Areas will require, at a minimum, authorization by Radiation Protection, the use of a radiation work permit (RWP), and instruction of individuals gaining unescorted access in accordance with 10 CFR 19.12 and consistent with the guidance in Regulatory Guide 8.13. In addition to the foregoing, unescorted access to Contaminated, High Radiation, Very High Radiation, or Airborne Radioactivity Areas will require, at a minimum, training of individuals gaining unescorted access consistent with Regulatory Guides 8.27 and 8.29.

Posted areas will generally be contained within the plant Security Area, i.e., an area to which access is controlled in accordance with 10 CFR 73. Unescorted access to the plant Security Area will require instruction of individuals gaining unescorted access in accordance with 10 CFR 19.12.

Areas where significant doses could be received (e.g., High Radiation, Very High Radiation, and Airborne Radioactivity Areas) ~~will be~~are generally contained within the plant building complex. A Radiological Controlled Area (RCA) is~~will be~~ established to encompass the plant building complex to enhance control over access to such areas. Access to the RCA ~~will be~~is ~~-~~ through a primary access control point or alternate access control points as established by Radiation Protection. Unescorted access to the RCA will require authorization by Radiation Protection, the use of a radiation work permit, and instruction and training of individuals gaining unrestricted access in accordance with 10 CFR 19.12 and consistent with the guidance in Regulatory Guides 8.13, 8.27, and 8.29.

Radiation Protection may authorize access to the Security Area, RCA, or a Radiation or Radioactive Materials Area for individuals without instruction or training where such individuals are continuously under the control of a designated escort who is instructed and trained in accordance with 10 CFR 19.12 and consistent with the guidance in Regulatory Guides 8.13, 8.27, and 8.29, and instructed on the duties and responsibilities associated with being an escort.

Access by a worker who is a minor (i.e., under the age of 18 years) or declared pregnant worker to posted areas with a potential for significant exposure, e.g., High Radiation, Very High Radiation, and Airborne Radioactivity Areas is~~will be~~ restricted unless otherwise authorized by Radiation Protection.

12.5.4.4 Radiation Work Permits

Procedures covering the use of a radiation work permit (RWP) ~~will be~~are consistent with the guidance in Regulatory Guide 8.8.

Radiation work permits (RWPs) ~~will be~~are issued by Radiation Protection to help ensure adequate protection of personnel for access to and work within areas with a potential for significant exposure. Access to any posted area will require a radiation work permit (RWP). An RWP may co~~ver~~ntrol access to multiple areas or to a set of related jobs or tasks.

At a minimum, each RWP will include the following information:

1. Description of the area(s) to be accessed and work to be performed;
2. Designation of personnel or groups covered by the RWP;
3. Radiological conditions existing within the area(s) to be accessed, based on current surveys, and anticipated radiological conditions for the time span over which the work is~~will be~~ performed,;
4. Requirements for use of personnel monitoring devices, protective clothing, and respiratory protection equipment,
5. Special instructions and a description of special tools, shielding, other equipment, and any process and engineering controls being employed to minimize exposures; and
6. Extent and type of radiation protection monitoring and surveillance to be provided.

For access to and work within High Radiation and Very High Radiation Areas, the applicable RWP will specify a limitation on stay-time or a means for limiting dose received while in the area (e.g., via an alarm set point for an electronic dosimeter).

12.5.4.5 Personnel Monitoring

Personnel monitoring procedures ~~will be~~are sufficient to assure compliance with 10 CFR Parts 19 and 20 and ~~will be~~are consistent with the guidance in Regulatory Guides 8.2, 8.7, 8.9, 8.13, 8.20, 8.26, 8.32, 8.34, 8.35, and 8.36~~, and 8.38~~.

Each individual accessing the RCA or a posted area on an unescorted basis, or for whom occupational dose monitoring of external dose is required in accordance with 10 CFR 20, is~~will be~~ monitored using an individual monitoring device that is appropriate for monitoring the types of external radiation to which the individual is exposed. For individuals who are required to be monitored in accordance with 10 CFR 20, if the individual monitoring device does not provide real-time dose information (i.e., the capability for the individual to track his or her own dose as it occurs), then an additional means of monitoring is~~will be~~ provided for the individual that fulfills that function.

Individuals accessing the RCA or a posted area on an escorted basis, for whom occupational dose monitoring of external dose is not required in accordance with 10 CFR 20, is~~will be~~ monitored either with an individual monitoring device worn by the individual or via an individual monitoring device worn by the escort.

Individual monitoring devices that require processing, except for those devices excluded by 10 CFR 20.1501(c), ~~will be~~are processed and evaluated by a NVLAP-accredited processor, as appropriate, ~~and will be certified~~ for the type(s) and ranges of radiation being monitored with the device ~~prior to its use~~.

Each individual whose internal dose is required to be monitored in accordance with 10 CFR 20, or who wears a respirator for radiation protection purposes, or who accesses an Airborne Radioactivity Area, is~~will be~~ monitored by means sufficient to identify and quantify intakes in order to be able to estimate his or her committed effective dose equivalent (CEDE) and, as applicable, his or her committed dose equivalent (CDE).

Situations that may result in a person receiving an abnormal or inadvertent intake ~~will be~~are evaluated on a case-by-case basis to determine the need for monitoring by means sufficient to identify and quantify intakes in order to be able to estimate the CEDE or CDE, as applicable.

Individuals suspected of having received an intake ~~will be~~are evaluated to quantify the intake, if any, in order to estimate the CEDE or CDE, as applicable.

~~Planned special exposures, as defined in 10 CFR 20.1206, if used, will be conducted in accordance with the requirements in 10 CFR 20.2104 and consistent with the guidance in Regulatory Guide 8.35.~~

In demonstrating compliance with regulatory requirements, effective dose equivalent may be used in lieu of deep dose equivalent consistent with the guidance in Regulatory Issue Summary (RIS) 2003-04 and other related guidance.

Individual monitoring results ~~will be~~are reported annually to the individual, and at the request of an individual who is terminating employment or who is requesting this information from a previous employer, in accordance with the requirements in 10 CFR 19.13.

Personnel monitoring records, as well as records associated with testing, calibration, processing, and maintaining instrumentation and equipment used for personnel monitoring, ~~will be~~are documented and maintained in accordance with applicable requirements in 10 CFR 20-2101-20.2110.

12.5.4.6 Dose Control

Compliance ~~will be~~are maintained with regulatory dose limits. Doses to adult workers ~~will be~~are kept below the occupational dose limits in 10 CFR 20.1201. Doses to workers who are minors and declared pregnant workers ~~will be~~are kept below the respective occupational dose limits in 20.1207 and 20.1208. Doses to members of the public ~~will be~~are kept below public dose limits in 10 CFR 20.1301.

To the extent practical, procedures and engineered controls based on sound radiation protection principles ~~will be~~are used to keep occupational doses and doses to members of the public as low as reasonably achievable (ALARA). A description of facility design features and engineered controls intended to maintain occupational exposures is included in Sections 12.3-12.4. A description of systems and facility design features intended to maintain public exposures ALARA is included in Section 11.

As described in Sections 12.5.1 and 12.5.2, management policy is~~will be~~ established, and organizational responsibilities and authorities ~~will be~~are assigned to implement an effective program for maintaining occupational radiation exposures ALARA. Procedures ~~will be~~are established and implemented that are in accordance with 10 CFR 20.1101 and consistent with the guidance in Regulatory Guides 8.8 and 8.10. Examples of such procedures include the following:

1. During the construction, pre-operational and operational phases, Radiation ~~Prtoection~~Protection will assure that new or modified designs and the selection of

equipment are reviewed to assure that measures are considered to minimize occupational and public radiation exposures during operation, refueling, and decommissioning of the plant.

2. Radiation ~~Prtoection~~Protection will assure that procedures and methods for operation, maintenance, repair, surveillance, refueling, and other activities that may involve significant exposures are reviewed prior to initial use and periodically thereafter to assure measures are considered to minimize occupational and public radiation exposures. [Note: A definition of "significant exposures" should be included with this paragraph. For example, "significant exposures" may include activities that are estimated to involve greater than 1 person--rem of collective dose.]

3. For activities involving significant exposures, pre-job briefings ~~will be~~are conducted for personnel who will receive the exposures to assure that they understand the radiological conditions expected to be present and the measures being employed to control and minimize dose; post-job reviews ~~will be~~are performed to evaluate the effectiveness of measures employed to control and minimize dose and to identify and implement improvements for future similar activities.

Planned special exposures, as described in 10 CFR 20.1206, if used, will be conducted in accordance with the requirements in 10 CFR 20.2104 and consistent with the guidance in Regulatory Guide

12.5.4.7 Contamination Control

Contamination control procedures ~~will be~~are established to help assure compliance with 10 CFR Parts 20.1406 and 20.1701 and to prevent the unauthorized release of radioactive materials to unrestricted areas.

Areas, items, and personnel ~~will be~~are routinely surveyed and monitored for contamination to protect personnel, ensure that contamination control methods are effective and to prevent licensed materials from being released from an RCA or Controlled Area in an unauthorized manner. Areas and items with fixed or removable contamination ~~will be~~are posted, labeled, or marked in a conspicuous manner to indicate the presence of contamination.

Personnel accessing Contaminated or Airborne Radioactivity Areas ~~will be~~are required to use protective clothing and equipment as appropriate to the circumstances to prevent personal contamination.

Personnel found with external contamination ~~will be~~are decontaminated promptly. Contaminated items will ~~either be~~be decontaminated or disposed of as radioactive waste or ~~will be~~are marked, controlled and, when not in use, stored and secured in accordance with 10 CFR 20.1801. Areas that become contaminated ~~will be~~are decontaminated as soon and as thoroughly as practical, taking into account factors such as the nature of operations in the area and the potential for exposure associated with the decontamination.

The number of accessible contaminated areas within the plant ~~will be~~are kept to a minimum.

Practical measures ~~will be~~are implemented to prevent the spread of contamination, including, for example:

1. Air pressure gradients and airflows ~~will be~~are maintained from areas of low potential contamination to areas of higher potential contamination;
2. Leaks and spills ~~will be~~are contained promptly and repaired or cleaned up as soon as practical;
3. Potentially contaminated systems, equipment and components when opened or prior to removal, ~~will be~~are surveyed for the presence of contamination;
4. Containments, caches and enclosures ~~will be~~are used during maintenance, repairs, and testing when practical to contain spills or releases;
5. Engineering controls such as portable ventilation or filtration units to reduce concentrations of radioactivity in air or fluids ~~will be~~are used where practical;
6. Criteria for selecting tools, materials, and equipment for use in contaminated areas will include minimizing the use of porous or other materials that are difficult to decontaminate;
7. The use of disposable materials that are likely to become contaminated and necessitate disposal as radioactive waste ~~will be~~are minimized;
8. Areas, surfaces, and tools that are prone to contamination ~~will be~~are designed and coated (e.g., using agents to "fix" contamination, such as strippable coatings), as practical to facilitate decontamination.
9. Contaminated tools and equipment ~~will be~~are segregated from clean tools and equipment.

12.5.4.8 Respiratory Protection

Respiratory protection procedures will assure compliance with 10 CFR 20, Subpart H, and ~~will be~~are consistent with the guidance in Regulatory Guide 8.15.

A written policy statement is~~will be~~ issued by the plant management, covering the use of process and engineering controls in lieu of respirator use to limit intakes and the routine, non-routine, and emergency use of respirators

Written procedures ~~will be~~are established and implemented that cover the following:

1. Monitoring, including air sampling and bioassays;
2. Supervision and training of respirator users;
3. Fit-testing;
4. Respirator selection;
5. Breathing air quality;
6. Inventory, control, storage, issuance, maintenance, repair, testing, and quality assurance of respiratory protection equipment;
7. Recordkeeping; and
8. Limitations on periods of use and relief from respirator use.

For use of respiratory protection equipment to limit intakes of radioactive materials, an assessment is~~will be~~ performed to assure that the TEDE ~~will be~~are maintained ALARA.

Airborne radioactivity is~~will be~~ minimized by the design and configuration of the plant's heating, ventilation and air conditioning systems (HVAC), the use of enclosures and containments, and good housekeeping practices. Portable air movers and vacuums equipped with HEPA filters to minimize concentrations of radioactivity in air or on ~~surfaces,~~surfaces ~~will be~~are vented to monitored, filtered discharge pathways.

When it is not practical to apply process and engineering controls to control the concentrations of radioactive materials in the air and maintain the total effective dose equivalent (TEDE) ALARA, intakes ~~will be~~are limited by controlling access to and limiting stay times in Airborne Radioactivity Areas and by using respiratory protection equipment or other controls.

The RPM will assign to a single individual, knowledgeable in the area of respiratory protection consistent with the guidance in Regulatory Guide 8.15, the overall responsibility to establish and maintain a respiratory protection program and procedures that include:

1. air sampling and monitoring sufficient to identify hazards, select proper equipment, and determine doses from intakes;

2. ~~conducitng~~conducting surveys and bioassays as necessary to evaluate actual intakes; and

3. ~~testing~~testing respirators for operability immediately prior to each use..

Only respiratory protection equipment that is tested and certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA) is~~will be~~ used, unless otherwise authorized by the NRC.

Prior to being fit-tested for a face sealing respirator, and before the first field use of a non-face sealing respirator, individuals ~~will be~~are certified as medically fit by a qualified medical practitioner. Recertification of medical fitness is~~will be~~ made every twelve months or at a frequency specified by the medical practitioner.

Each respirator user is~~will be~~ advised that he or she may leave the area at any time for relief from any conditions (such as equipment malfunction, physical or psychological distress, or communications failure) that might require such relief.

In selecting and using respiratory protection equipment, provision ~~will be~~are made for vision correction, adequate communications, extreme temperature conditions, and concurrent use of other safety or radiological protection equipment.

For circumstances when respiratory protection equipment is used from which an unaided individual would have difficulty extricating himself or herself, and therefore might be

exposed to a potentially life-threatening situation, a standby rescue person is~~will be~~ required. The standby rescue person shall be equipped with respiratory protection equipment appropriate for the potential hazards and shall be immediately available to provide assistance.

12.5.4.9 Radioactive Material Control

Procedures ~~will be~~are established, implemented and maintained that assure compliance with the requirements of 10 CFR 20.1801, 20.1802, 20.1902, 20.1904, 20.1905, 20.1906, 20.2001, 20.2005, 20.2006, 20.2007, and 10 CFR Part 71.5 to assure positive control over licensed radioactive material so that unnecessary or inadvertent exposures do not occur and such material is not released into uncontrolled areas in a manner that is not authorized by regulation or the license.

12.5.4.10 Radiation Protection Training

Procedures ~~will be~~are developed, implemented, and maintained that assure that selection, qualification, training, and periodic retraining of radiation protection staff and radiation workers ~~will be~~are conducted in accordance with the requirements in 10 CFR Parts 19, 20, and 50.120 and consistent with the guidance in Regulatory Guides 1.8, 8.13, 8.15, 8.27, and 8.29.

12.5.4.11 Quality Assurance

Consistent with the requirements of10 CFR 20.1101, t~~T~~he radiation protection program and ~~-~~procedures ~~will be~~are established, implemented, ~~and~~ maintained and reviewed, ~~as required by 20.1101~~, under the~~a~~ quality assurance program ~~that is consistent with~~described in ~~-~~FSAR Section XXX [insert the FSAR section reference that includes a~~the~~ description of the 10 CFR 50, ~~Apopendix~~Appendix B quality assurance program] that fuflills the requirements of 10 CFR 50, Appendix B and is consistent with the guidance in Regualtory Guide 1.33, including the conduct of periodic reviews and audits, identification and resolution of problems, and documentation and maintenance of quality assurance records.

~~Consitent~~Consistent with the requirements in 10 CFR 71.101(f), the quality assurance program described in FSAR Section XXX [include same reference as in the previous paragraph] that fulfills the requirements of 10 CFR 50, Appendix B, and is consitent with the guidance in Regulatory Guide 1.33 will apply to the ~~licensee~~ programs, procedures and activities involving the transportation of radioactive material.

Attachment 2