NEI 07-03A [Revision 0]

Generic FSAR Template Guidance for Radiation Protection Program Description

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Nuclear Energy Institute

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NOTICE

EXECUTIVE SUMMARY

NEI 07-03A*, Generic FSAR Template Guidance for Radiation Protection Program Description,* Revision 0, provides a complete generic program description for use in developing construction and operating license (COL) applications. The document reflects contemporary NRC guidance, including Regulatory Guide 1.206 (Draft Guide DG-1145), "COL Applications for Nuclear Power Plants (LWR Edition)," and industry-NRC discussions regarding the applicable standard review plan section. A main objective of this program description is to assist in expediting NRC review and issuance of the combined license.

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GENERIC FSAR TEMPLATE GUIDANCE FOR RADIATION PROTECTION PROGRAM DESCRIPTION

12.5 RADIATION PROTECTION PROGRAM

A radiation protection program is developed, documented, and implemented through plant procedures that address quality requirements commensurate with the scope and extent of licensed activities, sufficient to ensure compliance with the provisions of 10 CFR Parts 19, 20, 50, 52, and 71 and consistent with the guidance in Regulatory Guides 1.8, 1.206, 8.2, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.13, 8.15, 8.27, 8.28, 8.29, 8.34, 8.35, 8.36, 8.38, and the consolidated guidance in NUREG-1736.

In accordance with 10 CFR 20, Subpart B, the purpose of the radiation protection program is to maintain occupational and public doses below regulatory limits and as low as is reasonably achievable (ALARA). To achieve this, the program will include:

I. A documented management commitment to keep exposures ALARA;

II. A trained and qualified organization with sufficient authority and well-defined responsibilities; and

III. Adequate facilities, equipment, and procedures to effectively implement the program.

The operational radiation protection program is implemented in stages consistent with the following milestones:

1. Prior to initial receipt of by-product, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18), and thereafter, when such radioactive materials are possessed under this license, the following radiation protection program elements will be in place:

    a. Organization – A radiation protection supervisor and at least one (1) radiation protection technician, each selected, trained and qualified consistent with the guidance in Regulatory Guide 1.8.

    b. Facilities – A facility or facilities to support the receipt, storage and control of non-exempt radioactive sources in accordance with 10 CFR 20.1801, 20.1802, and 20.1906.

    c. Instrumentation and Equipment –Adequate types and quantities of instrumentation and equipment will be selected, maintained, and used to provide for the appropriate detection capabilities, ranges, sensitivities, and accuracies to conduct radiation surveys and monitoring (in accordance with 10

CFR 20.1501 and 20.1502) for the types and levels of radiation anticipated for the non-exempt sources possessed under this license.

d. Procedures – Procedures will be established, implemented and maintained sufficient to maintain adequate control over the receipt, storage, and use of radioactive materials possessed under this license and as necessary to assure compliance with 10 CFR 19.11 and 19.12 and the applicable portions of 10 CFR Part 20, commensurate with the types and quantities of radioactive materials received and possessed under this license.

e. Training – Initial and periodic training will be provided to individuals responsible for the receipt, control or use of non-exempt radioactive sources possessed under this license in accordance with 10 CFR 19.12 and consistent with the guidance in Regulatory Guides 1.8, 8.13, 8.27, and 8.29.

2. Prior to receiving reactor fuel under this license, and thereafter, when reactor fuel is possessed under this license, plant procedures on criticality accident requirements will be established, implemented and maintained and radiation monitoring will be provided in accordance with 10 CFR 50.68, in addition to the radiation protection program elements specified under item 1, above.

3. Prior to initial loading of fuel in the reactor, all of the radiation protection program functional areas described in Section 12.5 will be fully implemented, with the exception of the organization, facilities, equipment, instrumentation, and procedures necessary for transferring, transporting or disposing of radioactive materials in accordance with 10 CFR Part 20, Subpart K, and applicable requirements in 10 CFR Part 71. In addition, the position of radiation protection manager (as described in section 12.5.2.3) will be filled and at least one (1) radiation protection technician for each operating shift, selected, trained and qualified consistent with the guidance in Regulatory Guide 1.8, will be onsite and on duty when fuel is initially loaded in the reactor, and thereafter, whenever fuel is in the reactor.

4. Prior to initial transfer, transport or disposal of radioactive materials, the organization, facilities, equipment, instrumentation, and procedures will be in place as necessary to assure compliance with 10 CFR Part 20, Subpart K, and applicable requirements in 10 CFR Part 71.

The radiation protection program content and effectiveness of implementation are reviewed periodically (at least annually) pursuant to plant procedures.

12.5.1 MANAGEMENT POLICY

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

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

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

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

IV. 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;

V. 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;

VI. 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;

VII. Establish a direct reporting chain of the Radiation Protection Manager to the Plant Manager that is at the same reporting level as, but independent of, the reporting chains for Operations and Maintenance.

VIII. Establish an ALARA Committee with delegated authority from the Plant Manager that includes, at a minimum, the managers of Operations, Maintenance, Work Control, Engineering and Radiation Protection 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 Chapter 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:

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

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

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

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

V. Establish plant goals and objectives for radiation protection;

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

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

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

IX. Establish an ALARA Committee that includes, at a minimum, the managers of Operations, Maintenance, Work Control, 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 for reinforcing behaviors that promote radiation protection. Specifically, managers and supervisors are responsible for the following, as applicable to their position within the plant organization:

I. 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;

II. 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;

III. 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;

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

V. Support the Radiation Protection Manager (RPM) in implementing the radiation protection program;

VI. Ensure 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:

I. Manage the radiation protection organization;

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

III. Provide radiation protection input to facility design, including plant modifications, and work planning;

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

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

VI. 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;

VII. Participate as a member of the plant ALARA committee.

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 will be onsite and on duty at all times for each operating shift commencing with initial loading of fuel in any reactor at the site (i.e., at least one RPT per shift is required per site).

The qualifications and experience of RPTs are consistent with the guidance contained in 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 those listed below.

[COL applicants may modify the list of RPT responsibilities listed in this template based on company and site-specific information.]

I. 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;

II. Provide radiological job coverage and monitor radiation conditions for jobs potentially involving significant radiation exposure;

III. 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;

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

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

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

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

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

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

X. 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;

XI. Provide personnel monitoring and bioassay services;

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

XIII. Perform assigned emergency response duties.

12.5.2.5 Radiation Protection Supervisory and Technical Staff

Radiation protection supervisory and technical staff within the radiation protection organization are available, 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.

I. Respiratory Protection

II. Personnel Dosimetry

III. Bioassay

IV. Instrument Calibration and Maintenance

V. Radioactive Source Control

VI. Effluents and Environmental Monitoring and Assessment

VII. Radioactive Waste Shipping

VIII. Radiation Work Permits

IX. Job Coverage

X. Radiation Monitoring and Surveys

12.5.3 FACILITIES, INSTRUMENTATION AND EQUIPMENT

Adequate facilities, instrumentation and equipment 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 are consistent with the guidance in Regulatory Guides 1.97 (and guidance provided in Branch Technical Position 7-10, Revision 5 to NUREG 0800), 8.2, 8.4, 8.6, 8.8, 8.9, 8.10, 8.15, and 8.28 and the criteria in NUREG-0737, Items II.B.3 and III.D.3.3.

12.5.3.1 Facilities

[COL applicants may incorporate by reference in this section of the FSAR facility descriptions that were previously reviewed in an applicable design control document (DCD).]

[COL applicants may modify the section below, based on company and site-specific information, to indicate alternate or additional facilities and facilities that may be located off site and functions that may be carried out at another location or through a vendor.]

Radiochemistry Laboratory

The radiochemistry laboratory facility is centrally located for receiving, storing, preparing, analyzing, and disposing of solid, liquid, and gaseous sample media. The facility contains a floor drain(s), sink(s), fume hood(s), cabinet(s) with worktop(s), storage locker(s), and emergency shower/eyewash system(s) as needed to support the scope of work performed. Drains are piped to the chemical waste collection system and/or the liquid radioactive waste system. The fume hood exhausts to a monitored building ventilation exhaust system.

The facility includes a counting room for analyzing samples. The counting room is 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.

The laboratory/counting room facility and instrumentation 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 post-accident reactor coolant and containment atmosphere samples.

Access Control Facility

Access control facilities 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 are located at the access control facility. The change areas are sufficiently sized to support both routine and typical refueling outage

conditions. In addition, the capability is available to set up alternate access control points and change facilities on a temporary basis as necessary to support large-scale outages, both at access points to the RCA, as well as at 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 established near the primary access control facility. The personnel decontamination area is 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 are located near the RCA access control point(s). Radiation protection offices sufficient to house the staff and support radiation protection responsibilities are provided at a location(s) suitable for carrying out those responsibilities. The offices include furnished areas for radiation protection staff to perform administrative work, maintain files, etc. Space is also provided for storage and issuance of radiation protection equipment, instrumentation, dosimetry, and supplies.

Portable Instrument Calibration Facility

A portable instrument calibration facility is 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 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 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 are maintained within the respirator facility to efficiently perform these functions. When not in use, the facility is secured to maintain positive control over the issuance of respiratory protection devices. Only respirators with no removable contamination will be brought into the Respirator Facility. Used/contaminated respirators will be 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 are performed in a facility set up for that specific purpose. The facility 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 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 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 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. Clean and contaminated tools and equipment are segregated to avoid cross-contamination.

Radioactive Materials Storage Area

A radioactive materials storage area(s) is established, as needed and in accordance with 10 CFR 20.1801, 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 performance of bioassay, including *in-vivo* and *in-vitro* bioassay. The facility for dosimetry processing is accredited 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, is designed and configured to allow for low background counting sufficient to meet range and sensitivity criteria consistent with the guidance in Regulatory Guide 8.9. The facility for in-vivo bioassay allows for the collection, processing, storage and shipment of samples for analysis. Vendor supplied services may also be utilized for dosimetry processing and bioassay.

Laundry Facility

A facility is 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 is reasonably achievable (ALARA). Radioactive wastes resulting from the laundering and cleaning processes are collected and properly disposed of in accordance with the requirements in 10 CFR Part 20, Subpart K. Vendor supplied services may also be utilized for laundering of contaminated personnel protective clothing and equipment.

12.5.3.2 Monitoring Instrumentation and Equipment

Radiation monitoring instrumentation and equipment are selected, maintained and used to provide the appropriate detection capabilities, ranges, sensitivities and accuracies required for the types and levels of radiation anticipated at the plant and in the environs during routine operations, major outages, abnormal occurrences, and postulated accident conditions. The quantities of instrumentation and equipment 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:

[COL applicants may modify the section below, based on company and site-specific information, to indicate alternate or additional instrumentation and equipment.]

Laboratory and Fixed Instrumentation

- 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.
- Counters to measure gross beta and gamma activity.
- A low background counter to detect and measure gross alpha activity.
- A liquid scintillation counter to measure tritium in liquid and gaseous samples.
- A whole-body counter to detect and quantify personnel intakes of radioactivity.
- 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)

- Beta-gamma count rate survey meters (0-50,000 cpm) to detect radioactive contamination on surfaces and for low level exposure rate measurements.
- Low-range (0-50 mR/hr) and high range (0-1,000 R/hr) beta-gamma 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 (including underwater operations), abnormal occurrences and accidents.
- Beta-gamma survey meters (0-10,000 R/hr) to monitor the plant and environs during and following an accident.
- Count rate meters (0-500,000 cpm) to monitor directly for alpha activity.
- Neutron survey instruments (0-5 rem/hr) to measure neutron dose rates for radiation protection purposes (including underwater operations).
- 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.

- Continuous air monitors (CAMs) provide a 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.
- Hand-held friskers to detect radioactive contamination.
- 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.
- Portable sampling and onsite analysis capability to assess airborne radiohalogens and particulates released during and following an accident consistent with the criteria in Regulatory Guide 1.97 (and guidance provided in Branch Technical Position 7-10, Revision 5 to NUREG 0800).

Personnel Monitoring Instrumentation and Equipment

- 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.
- Direct-reading dosimeters to provide real-time gamma dose information with sensitivities and ranges appropriate to measure the expected levels and types of radiation.
- Special dosimeters to monitor extremity dose with sensitivities and ranges appropriate to measure the expected levels and types of radiation.
- Personnel air samplers to monitor individual exposure to airborne radioactivity.
- Remote and local reading alarm dosimeters (which may be coupled with direct or electronic surveillance equipment, as necessary).

12.5.3.3 Personnel Protective Clothing and Equipment

A sufficient inventory of serviceable personnel protective clothing and equipment 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, are used.

[COL applicants 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 includes the following:

- Anti-contamination clothing for both dry and wet work conditions, including heat stress reduction accessories
- Head covers, shoe covers, gloves, and safety-related items
- Full facemask respirators with high-efficiency particulate and charcoal filters
- Pressure demand full facemask air line respirators

- Pressure demand full facemask self-contained breathing apparatus

12.5.3.4 Other Protective Equipment

- Portable ventilation systems with HEPA filters
- Temporary containments, tents, and enclosures
- Heat-stress reduction equipment
- Vacuums with HEPA filters
- Portable liquid filtration equipment
- Temporary shielding such as lead and/or tungsten shield bricks, blankets, and curtains.

12.5.4 PROCEDURES

Radiation protection procedures 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 that include quality assurance requirements are prepared consistent with the guidance in Regulatory Guides 1.8, 8.2, 8.7, 8.8 and 8.10 and the consolidated guidance referenced in NUREG-1736 that is applicable to power reactors. The procedures 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. Additionally, 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 comply with 10 CFR 20.1501 and 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 are selected based upon the purpose of the survey and the anticipated types and levels of radiation and radioactivity involved. Surveys 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 are performed more frequently in accessible areas subject to changes in radiological conditions. Site specific procedures will define the survey frequencies and extent.

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

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

Area contamination surveys are routinely performed for the detection of removable and fixed beta-gamma contamination. Surveys for alpha contamination 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 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 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 are set at a fraction of the concentration values given in 10 CFR Part 20, Appendix B, Table 1, Column 3, for radionuclides expected to be encountered. Air monitoring and sampling 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.

Emergency operating procedures 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 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 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 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 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 are documented and maintained in accordance with applicable requirements in 10 CFR 20.2101-20.2110.

12.5.4.2 Methods to Maintain Exposures ALARA

Methods to maintain exposures ALARA in accordance with Regulatory Guides 8.8 and 8.10 are included in radiation protection procedures, as well as applicable operating and maintenance procedures. Key ALARA operational policies and considerations are described in FSAR Section 12.1. Some examples of the types of methods that will be used to maintain exposures ALARA are discussed below for the following operational categories.

[COL applicants may modify the section below, based on company and site-specific information, to indicate alternate or additional procedures for maintaining exposures ALARA.]

Refueling

After the reactor coolant system is depressurized, it is degassed as needed and sampled to verify that the gaseous radioactivity is low, prior to removing the reactor head. The Radiation Work Permit (RWP) system is used to maintain positive radiological control over work in progress. Prior to and during refueling, the refueling pool water is continually purified in order to maintain exposures from activity in the water ALARA. During refueling operations, irradiated fuel assemblies are maintained underwater at all times. By following these procedures, exposures from refueling operations are maintained ALARA.

Inservice Inspection

Prior to entry into radiation areas to perform inspections, personnel should study, as appropriate: blueprints, drawings, photographs, videotapes, previous inspection reports, previous radiation and contamination surveys, and/or previous RWPs appropriate to the particular inspection/job to be performed. This will acquaint personnel with the inspection location, room layout and equipment configuration, the work to be done, and radiation and contamination levels previously experienced at the location. Surveys are performed to the extent required to determine current contamination and/or radiation levels. From this data, previous data, and past work experience of personnel for similar jobs/inspections performed, an RWP (paragraph 12.5.4.5) is issued. Equipment is checked and/or calibrated to verify it is operating properly prior to entry into the radiation area. Temporary shielding will be used, where practicable, to reduce personnel radiation exposures.

Radwaste Handling

The handling of radwaste by station personnel has been minimized by plant design. The radwaste system is shielded and incorporates remotely operated liquid radwaste systems.

The systems are designed to minimize operator exposure in all waste processing and handling operations. The radwaste system is described in FSAR Chapter 11.

Spent Fuel Handling

Spent fuel handling and loading of shipping casks is performed underwater, using fuel handling cranes and/or manual extension tools. This operation normally requires a small crew working in the fuel handling area and usually involves minimal exposure to radiation. The RWP system will be used to maintain positive radiological control over this task.

Some of the methods used to maintain exposure ALARA during spent fuel handling are; maintain at least 8 feet of water above the fuel assembly to minimize radiation levels, purify fuel pool water to minimize exposure due to water activity, cool the spent fuel pool water to minimize evaporation, provide continuous air sampling while moving fuel to evaluate airborne activity in the area, and have emergency (including evacuation) procedures immediately available. After the shipping cask is loaded, it is decontaminated using a pressurized water washing device to minimize loose contamination on the cask. This minimizes the amount of hand cleaning needed to decontaminate the cask.

Normal Operation

The plant was designed so that significant radiation sources are minimized, shielded, and/or located in cubicles. Instrument readouts for instrumentation required for normal operation, for the most part, can be read remotely from the control room or from other low radiation areas. Instrumentation that cannot be placed remotely in a low radiation area or that is read infrequently is situated, where possible, so that it can be read from the entrance to the cubicle or from a low radiation area within the cubicle. Operators are instructed to minimize their stay in areas in which radiation levels are high, and they are apprised of locations within such areas where the radiation level is usually the lowest. If an operator plans to enter a high radiation area, he notifies radiation protection personnel and specifies the high radiation area(s) to be accessed. Upon exiting the high radiation area(s), he records exposure data and time spent in the area.

Routine Maintenance

Routine maintenance is comprised of the categories of preventive maintenance (planned and scheduled maintenance such as lubrication, adjustments, and tests) and corrective maintenance (unscheduled maintenance such as valve packing, pump seal replacement, and stopping leaks). Procedures are usually written for preventive maintenance jobs and for some recurring corrective maintenance jobs. These procedures specify the precautions to be taken to minimize personnel exposure while performing the maintenance. The procedures list the required lubricants, special tools and equipment, and the acceptance standards. This serves to minimize the time spent in the radiation area and thereby minimize personnel dose.

In addition, the preventive maintenance procedure normally states whether an RWP is required. When the RWP is issued, the radiation and/or contamination levels are listed,

shielding is specified, if appropriate, and additional specific instructions are given to personnel. For corrective maintenance jobs in radiation areas, a similar approach is used.

Extension tools are used when practical to minimize personnel dose when working on radioactive components/equipment. Detailed surveys are performed and the RWP is issued (if required) with specific instructions. The individuals performing the work may be required to read procedure manuals or may be shown pictures or sketches of the work area to aid in understanding what is to be accomplished, how it is to be accomplished as safely and quickly as possible, and what the acceptance criteria are for completing the job. At the discretion of health physics personnel, additional requirements may be imposed to reduce personnel exposures.

After the job is completed, debriefings may be conducted to obtain input from personnel actually performing the work, as well as from supervisory and support personnel. This will assist in revising procedures for ALARA considerations.

Sampling

Most sampling of radioactive systems is performed inside the hoods in the sampling station in order to protect personnel from airborne activity. Protective clothing and gloves are required when sampling radioactive systems to prevent contamination of personnel.

A survey instrument may be used to check radiation levels when taking samples. When taking liquid samples, the liquid sample container is normally washed with clean water and dried to control contamination and maintain exposures ALARA before being brought into the radiochemistry laboratory for analysis. Care is taken to minimize spills. The dose received from handling sample bottles is minimized by grasping the bottle at the top, by using tongs, or by using a sample carrier.

Calibration

Calibration of most ranges of the portable gamma detection instruments is performed inside a shielded calibrator, thereby eliminating a large portion of the exposure received from calibration of portable instruments. Portable sources used to calibrate fixed instruments (such as the area radiation monitoring system) are transported in shielded containers to minimize personnel exposure.

Where possible, fixed instruments requiring routine calibration are situated so that the necessary test signals needed for calibration can be inserted from a low radiation area with the instruments in place.

12.5.4.3 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 are

posted in accordance with the requirements in 10 CFR 20.1901, 20.1902, and 20.1903. Containers of licensed radioactive materials are labeled in accordance with 10 CFR 20.1904 and 20.1905.

Criteria and procedures 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, are referred to hereafter as "Contamination Areas."

"Posted areas", as used in Section 12.5 of this FSAR, refers to Radiation Areas, High Radiation Areas, Very High Radiation Areas, Airborne Radioactivity Areas, Contamination Areas, and Radioactive Materials Areas.

12.5.4.4 Access Control

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

Access to posted areas is 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 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 (including the reasons for accessing the areas) and refer to its location on plant layout diagrams in FSAR Sections 12.3-4. This section should also provide the anticipated frequency of accessing each of the Very High Radiation Areas and should include a description of the additional administrative controls to be employed for restricting access to each Very High Radiation Area as required by 10 CFR 20.1602 and consistent with the guidance in Regulatory Guide 8.38. FSAR Sections 12.3-4 should include detailed drawings for each Very High Radiation Area that indicate physical barriers that completely enclose the respective area in a manner that is sufficient to thwart undetected entry into the area. Alternatively, if such detailed drawings are not available, describe how such barriers will be verified in the final design of the facility.]

Unescorted access to Radiation Areas or Radioactive Materials Areas will require, at a minimum, authorization by Radiation Protection, the use of an 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 Contamination, 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 Part 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), are generally contained within the plant building complex. A Radiological Controlled Area (RCA) is established to encompass the plant building complex to enhance control over access to such areas. Access to the RCA 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 an RWP 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. The designated escort shall be instructed and trained in accordance with the requirements of 10 CFR 19.12 and the guidance in Regulatory Guides 8.13, 8.27, and 8.29, and shall be 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 a declared pregnant worker to posted areas with a potential for significant exposure, e.g., High Radiation, Very High Radiation, and Airborne Radioactivity Areas is restricted unless otherwise authorized by Radiation Protection.

12.5.4.5 Radiation Work Permits

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

RWPs 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 an RWP. An RWP may control access to multiple areas or to a set of related jobs or tasks.

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

- Description of the area(s) to be accessed and work to be performed;
- Designation of personnel or groups covered by the RWP;
- Radiological conditions existing within the area(s) to be accessed, based on current radiological surveys, and anticipated radiological conditions for the time span over which the work is performed (including location of hot spots, radiation gradients, and low dose “waiting areas”);
- Requirements for use of personnel monitoring devices, protective clothing, and respiratory protection equipment;
- Special instructions and a description of special tools, shielding, other equipment utilized to perform work, and any process and engineering controls being employed to minimize exposures; and

- Extent and type of radiation protection monitoring and surveillance to be provided.

As described in Section 12.1 of the FSAR, 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).

12.5.4.6 Personnel Monitoring

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

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 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 Part 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 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 Part 20, are 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), are processed and evaluated by a NVLAP-accredited processor, as appropriate, for the type(s) and ranges of radiation being monitored with the device.

Each individual whose internal dose is required to be monitored in accordance with 10 CFR Part 20, or who wears a respirator for radiation protection purposes, or who accesses an Airborne Radioactivity Area, is 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 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 are evaluated to quantify the intake, if any, in order to estimate the CEDE or CDE, as applicable.

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 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, are documented and maintained in accordance with applicable requirements in 10 CFR 20-2101-20.2110.

12.5.4.7 Dose Control

Compliance is maintained with the requirements in 10 CFR 20.1201, 20.1202, 20.1203, and 20.1204, as they relate to demonstrating compliance with internal and external occupational dose limits contained in 10 CFR 20, Subpart C. Doses to adult workers are kept below the occupational dose limits in 10 CFR 20.1201. Doses to workers who are minors and declared pregnant workers are kept below the respective occupational dose limits in 10 CFR 20.1207 and 10 CFR 20.1208. Doses to members of the public are kept below public dose limits in 10 CFR 20.1301, which is demonstrated by complying with the requirements of 10 CFR 20. 1302.

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

As described in Sections 12.5.1 and 12.5.2, management policy is established, and organizational responsibilities and authorities are assigned to implement an effective program for maintaining occupational radiation exposures ALARA. Procedures 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:

I. During the construction, pre-operational and operational phases, Radiation 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.

II. Radiation 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 that assure measures are considered to minimize occupational and public radiation exposures. For example, “significant exposures” may include activities that are estimated to involve greater than 1 person-rem of collective dose.

III. For activities involving significant exposures, pre-job briefings are conducted for personnel who will receive the exposures. The briefings are intended to assure that personnel understand the radiological conditions expected to be present and the measures being employed to control and minimize dose. Post-job reviews are performed to evaluate the effectiveness of measures employed to control and minimize dose and to identify and implement improvements to minimize occupational and/or public radiation exposures 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 8.35.

12.5.4.8 Contamination Control

Contamination control procedures 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 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 are posted, labeled, or marked in a conspicuous manner to indicate the presence of contamination.

Personnel accessing Contamination or Airborne Radioactivity Areas are required to use protective clothing and equipment appropriate to the circumstances to prevent personal contamination.

Personnel found with external contamination are decontaminated promptly. Contaminated items are decontaminated or disposed of as radioactive waste or are marked and controlled. Areas that become contaminated 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 are kept to a minimum.

Facility design and operational procedures are reviewed to identify nonradioactive systems that could possibly become radioactive through interfaces with radioactive systems. Routine sampling and monitoring of these systems is described in the plant radiation monitoring program, and overall guidance is consistent with Bulletin 80-10.

Practical measures are implemented to prevent the spread of contamination, including:

- Air pressure gradients and airflows are maintained from areas of low potential contamination to areas of higher potential contamination and then to installed filters and/or ventilation systems;
- Leaks and spills are contained promptly and repaired or cleaned up as soon as practical;

- Potentially contaminated systems, equipment, and components are surveyed for the presence of contamination when opened or prior to removal;
- Containments, caches and enclosures are used during maintenance, repairs, and testing, when practical, to contain spills or releases;
- Engineering controls, such as portable ventilation or filtration units to reduce concentrations of radioactivity in air or fluids, are used where practical;
- 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;
- The use of disposable materials that are likely to become contaminated and necessitate disposal as radioactive waste are minimized;
- Areas, surfaces, and tools that are prone to contamination are designed and coated (e.g., using agents to "fix" contamination, such as strippable coatings), as practical, to facilitate decontamination;
- Contaminated tools and equipment are segregated from clean tools and equipment.

12.5.4.9 Respiratory Protection

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

A written policy statement established by the plant management covers the use of process and engineering controls in lieu of respirator use to limit intakes and to limit the routine, non-routine, and emergency use of respirators.

Written procedures are established and implemented that cover the following:

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

An assessment is performed to assure that the total effective dose equivalent (TEDE) is maintained ALARA, when respiratory protection equipment is used to limit intakes of radioactive materials.

Airborne radioactivity is 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 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 TEDE ALARA, intakes are limited by controlling access to and limiting stay times in Airborne Radioactivity Areas and by using respiratory protection equipment or other controls.

The Radiation Protection Manager 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:

- air sampling and monitoring sufficient to identify hazards, select proper equipment, and determine doses from intakes;
- conducting surveys and bioassays as necessary to evaluate actual intakes; and
- 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 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 are certified as medically fit by a qualified medical practitioner. Recertification of medical fitness is made every twelve months or at a frequency specified by the medical practitioner.

Each respirator user is 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, provisions 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 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.

12.5.4.10 Radioactive Material Control

Procedures 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, 20.2201, and 10 CFR 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.

12.5.4.11 Radiation Protection Training

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

12.5.4.12 Quality Assurance

The radiation protection program and procedures are established, implemented, maintained and reviewed consistent with the 10 CFR 20.1101 and the quality assurance criteria described in

[Note: Reference to appropriate section in Chapter 17 or other document to be provided by COL applicant].

Consistent with the requirements in 10 CFR 71.101(f), quality assurance requirements apply to the program, procedures and activities involving the transportation of radioactive material.

12.5.4.13 Reports

Procedures are established, implemented, and maintained to assure that reports and notifications are made in accordance with 10 CFR 20, Subpart M.

REFERENCES

1. 10 CFR Part 19, "Notices Instructions, and Reports to Workers: Inspections and Investigations."

2. 10 CFR Part 20, "Standards for Protection Against Radiation."

3. 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

4. 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."

5. 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

6. 10 CFR Part 73, "Physical Protection of Plants and Materials"

7. Regulatory Guide 1.8, Revision 3, "Qualification and Training of Personnel for Nuclear Power Plants."

8. Regulatory Guide 1.97, Revision 4, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants."

9. Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)."

10. Regulatory Guide 8.2, "Guide for Administrative Practices in Radiation Monitoring."

11. Regulatory Guide 8.4, "Direct-Reading and Indirect-Reading Pocket Dosimeters."

12. Regulatory Guide 8.6, "Standard Test Procedures for G-M Counters."

13. Regulatory Guide 8.7, Revision 2, "Instructions for Recording and Reporting Occupational Radiation Exposure Data."

14. Regulatory Guide 8.8, Revision 3, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be as Low as Is Reasonably Achievable."

15. Regulatory Guide 8.9, Revision 1, "Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program."

16. Regulatory Guide 8.10, Revision 1R, "Operational Philosophy for Maintaining Occupational Radiation Exposures as Low as Is Reasonably Achievable."

17. Regulatory Guide 8.13, Revision 3, “Instruction Concerning Prenatal Radiation Exposure.”

18. Regulatory Guide 8.15, Revision 1, “Acceptable Programs for Respiratory Protection.”

19. Regulatory Guide 8.27, “Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants.”

20. Regulatory Guide 8.28, “Audible Alarm Dosimeters.”

21. Regulatory Guide 8.29, Revision 1, “Instruction Concerning Risks from Occupational Radiation Exposure.”

22. Regulatory Guide 8.34, “Monitoring Criteria and Methods To Calculate Occupational Radiation Doses.”

23. Regulatory Guide 8.35, “Planned Special Exposures.”

24. Regulatory Guide 8.36, “Radiation Doses to Embryo/Fetus.”

25. Regulatory Guide 8.38, Revision 1, “Control of Access to High and Very High Radiation Areas of Nuclear Power Plants.”

26. NUREG-0737, “Clarification of TMI Action Plan Requirements.”

27. NUREG-1736, “Consolidated Guidance: 10 CFR Part 20 Standards For Protection Against Radiation.”

28. Regulatory Issue Summary 2003-04, “Use of the Effective Dose Equivalent In Place of the Deep Dose Equivalent in Dose Assessments.”

29. SRP Branch Technical Position (BTP) 7-10, “Guidance on Application of Regulatory Guide 1.97,” NUREG-0800.

APPENDIX A
FINAL SAFETY EVALUATION REPORT

March 18, 2009

Mr. Russell J. Bell, Director
New Plant Licensing
Nuclear Generation Division
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

SUBJECT: FINAL SAFETY EVALUATION FOR NUCLEAR ENERGY INSTITUTE TOPICAL REPORT NEI 07-03, GENERIC FINAL SAFETY ANALYSIS REPORT TEMPLATE GUIDANCE FOR RADIATION PROTECTION PROGRAM DESCRIPTION, REVISION 7 (PROJECT NO. 689)

Dear Mr. Bell:

By letter dated April 12, 2007, the Nuclear Energy Institute (NEI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review its proposed topical report, NEI 07-03, "Generic Final Safety Analysis Report (FSAR) Template Guidance for Radiation Protection (RP) Program Description," Revision 0. The template has undergone seven subsequent revisions. NEI submitted Revision 7 of the RP template by letter dated November 14, 2008.

Enclosed is the staff's safety evaluation (SE) which defines the basis for acceptance of NEI 07-03, Revision 7. The NRC staff finds that for combined license (COL) applications, NEI 07-03, Revision 7, provides an acceptable template for assuring that the RP program meets applicable NRC regulations and guidance.

Our acceptance applies only to material provided in NEI 07-03, Revision 7. We do not intend to repeat our review of the acceptable material described in the NEI 07-03, Revision 7. When the NEI 07-03, Revision 7 appears as a reference in COL applications, our review will ensure that the material presented applies to the specific application involved. Licensing requests that deviate from NEI 07-03, Revision 7, will be subject to a plant-specific or site-specific review in accordance with applicable review standards.

In accordance with the guidance provided on the NRC website, we request that NEI publish the accepted version of NEI 07-03, Revision 7 within three months of receipt of this letter. The accepted version should incorporate this letter and the enclosed SE after the title page. The accepted version should also contain historical review information, including NRC's requests for additional information and your responses. The accepted versions shall include a "-A" (designating accepted) following the report identification symbol.

If future changes to the NRC's regulatory requirements affect the acceptability of NEI 07-03, Revision 7, NEI will be expected to revise NEI 07-03 appropriately, or justify its continued applicability for subsequent referencing.

If you have any questions, please contact Sheryl A. Burrows at (301) 415-6086 or via email at Sheryl.Burrows@nrc.gov.

Sincerely,

/RA/

William F. Burton, Chief
Rulemaking and Guidance Development Branch
Division of New Reactor Licensing
Office of New Reactors

Project No. 689

Enclosure:
Safety Evaluation

cc w/encl: See next page

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If you have any questions, please contact Sheryl A. Burrows at (301) 415-6086 or via email at Sheryl.Burrows@nrc.gov.

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DATE	02/26/2009	02/24/2008	02/13/2009	03/18/2009	03/18/2009

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SAFETY EVALUATION

REGARDING THE NUCLEAR ENERGY INSTITUTE

TECHNICAL REPORT 07-03

"GENERIC FSAR TEMPLATE GUIDANCE FOR

RADIATION PROTECTION PROGRAM DESCRIPTION"

REVISION 7

1.0 BACKGROUND

By letter dated November 24, 2008, the Nuclear Energy Institute (NEI) submitted a technical report NEI 07-03, "Generic FSAR Template Guidance for Radiation Protection Program Description," Revision 7, for U. S. Nuclear Regulatory Commission (NRC) staff review. The technical report provides a complete generic radiation protection (RP) program description for use with combined license (COL) applications. NEI 07-03 was developed by the NEI New Plant Radiation Protection Task Force, which includes representatives from the four design-centered working groups, to assist in expediting NRC review and issuance of the combined license. NEI 07-03 is not applicable to the review and issuance of construction permits or operating licenses.

The generic Radiation Protection Program description presented in the NEI 07-03 Template commits an applicant to NRC regulatory requirements, guidance and acceptance criteria listed in Regulatory Guide (RG) 1.206 [Reference 5.3] and Section 12.5 of the Standard Review Plan (SRP) (NUREG-0800, March 2007) [Reference 5.2]. The NEI template identifies text entries that an applicant will provide as additional information. This information is identified in the NEI 07-03 Template by single braces ("[ ]") and the use of the word "note" preceding the text. Such information includes detailed descriptions of design and administrative controls for restricting access to Very High Radiation Areas, and a reference to the applicable Radiation Protection Program quality assurance criteria described in the applicant's Final Safety Analysis Report (FSAR). The NEI 07-03 Template also identifies text where the applicant may modify the generic information with plant and site-specific features. This information is identified in the template by the use of single braces ("[ ]"). As a result, the NEI 07-03 Template complies with applicable NRC regulations and guidance and may be used for COL applications submitted under the requirements of Subpart C of Title 10 of the *Code of Federal Regulations*, Part 52 (10 CFR Part 52). If a COL is issued, the licensee must develop operational programs by their implementation milestones, as required prior to fuel load, under regulatory requirements specified in Section 13.4 of applications, license conditions, and design certifications (DCs).

2.0 REGULATORY EVALUATION

The NRC staff verified that NEI 07-03, Revision 7, complies with the following regulations, regulatory guidance, NUREGs, and industry standards:

- 10 CFR Part 19, “Notices, Instructions and Reports to Workers: Inspections and Investigations”
- 10 CFR Part 20, “Standards for Protection against Radiation”
- 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities”
- 10 CFR Part 52, “Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants”
- 10 CFR Part 71, Subpart G, “Operating Controls and Procedures”
- 10 CFR Part 71, Subpart H, “Quality Assurance”
- RG 1.8, Revision 3, “Qualification and Training of Personnel for Nuclear Power Plants”
- RG 1.97, “Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants”
- SRP Branch Technical Position (BTP) 7-10, “Guidance on Application of RG 1.97”
- RG 8.2, “Guide for Administrative Practices in Radiation Monitoring”
- RG 8.4, “Direct-Reading and Indirect-Reading Pocket Dosimeters”
- RG 8.6, “Standard Test Procedures for G-M Counters”
- RG 8.7, “Instructions for Recording and Reporting Occupational Radiation Exposure Data”
- RG 8.8, “Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be as Low as Is Reasonably Achievable”
- RG 8.9, “Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program”
- RG 8.10, “Operational Philosophy for Maintaining Occupational Radiation Exposures as Low as Is Reasonably Achievable”
- RG 8.13, “Instruction Concerning Prenatal Radiation Exposure”
- RG 8.15, “Acceptable Programs for Respiratory Protection”
- RG 8.27, “Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants”

- RG 8.28, “Audible Alarm Dosimeters”
- RG 8.29, “Instruction Concerning Risks from Occupational Radiation Exposure”
- RG 8.34, “Monitoring Criteria and Methods To Calculate Occupational Radiation Doses”
- RG 8.35, “Planned Special Exposures”
- RG 8.36, “Radiation Doses to Embryo/Fetus”
- RG 8.38, “Control of Access to High and Very High Radiation Areas of Nuclear Power Plants”
- NUREG-0737, “Clarification of TMI Action Plan Requirements”
- NUREG-1736, “Consolidated Guidance: 10 CFR Part 20—Standards For Protection Against Radiation”
- NUREG-0800, Revision 3, Standard Review Plan, Section 12.5, “Operational Radiation Protection Program”

3.0 TECHNICAL EVALUATION

The staff’s review concentrated on the proposed radiation protection program description format, attributes and level of detail. In evaluating the adequacy of the format, attributes and level of detail, the staff followed the guidance of the SRP (NUREG-0800), Section 12.5 (SRP 12.5), “Operational Radiation Protection Program.” SRP 12.5 outlines an operational radiation protection program for DC, COL, construction permit, and operating license applicants and provides guidance in five radiation protection program operational program areas: organization, equipment, instrumentation, facilities and procedures.

3.1 Operational Radiation Protection Program Description Template Overview

NEI 07-03 provides guidance for a complete generic program description for use in developing COL applications. It will be incumbent on the applicant to provide site specific information, as described in NEI 07-03, to create a complete description of an operational radiation protection program, the purpose of which will be to maintain occupational and public doses below regulatory limits and as low as is reasonably achievable (ALARA). In order to achieve this, the program will include the following elements:

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.

NEI 07-03 describes a radiation protection program that will be implemented in stages consistent with the following milestones:

1) Prior to initial receipt of by-product, source, or special nuclear materials the following radiation protection program elements will be in place:

    a. Organization – A radiation protection program supervisor and at least one (1) radiation protection technician for each operating shift, selected, trained and qualified consistent with the guidance in RG 1.8.

    b. Facilities – A facility or facilities to support the receipt, storage and control of non-exempt radioactive sources in accordance with 10 CFR 20.1801, 20.1802, and 20.1906.

    c. Instrumentation and Equipment – Adequate types and quantities of instrumentation and equipment will be selected, maintained, and used to conduct radiation surveys and monitoring (in accordance with 10 CFR 20.1501 and 20.1502) for the types and levels of radiation anticipated for the non-exempt sources that will be possessed under the license.

    d. Procedures – Procedures will be established, implemented and maintained sufficient to maintain adequate control over the receipt, storage and use of radioactive materials that will be possessed under the license and to assure compliance with 10 CFR 19.11 and 19.12 and 10 CFR Part 20.

    e. Training – Initial and periodic training will be provided to individuals responsible for the receipt, control or use of non-exempt radioactive sources possessed under the license in accordance with 10 CFR 19.12 and consistent with the guidance in RGs 1.8, 8.13, 8.27, and 8.29.

2) Prior to receiving reactor fuel under this license, and thereafter whenever reactor fuel is possessed under the license, radiation monitoring will be established, implemented and maintained and procedures on criticality accident requirements will be established, implemented and maintained in accordance with 10 CFR 50.68, in addition to the radiation protection program elements specified in item 1 above.

3) Prior to initial loading of fuel in the reactor, all functional program areas described in this template will be fully implemented, with the exception of the program elements described in item 4 below. In addition, the position of radiation protection manager, as described in section 12.5.2.3, will be filled and at least one (1) radiation protection technician for each operating shift, who has been selected, trained and qualified consistent with the guidance in RG 1.8, will be onsite and on duty when fuel is initially loaded in the reactor, and thereafter, whenever fuel is in the reactor.

4) Prior to initial transfer, transport or disposal of radioactive materials, the organization, facilities, equipment, instrumentation, and procedures will be in place as necessary to assure compliance with 10 CFR Part 20, Subpart K, and applicable requirements in 10 CFR Part 71.

NEI 07-03 is organized into four areas: management policy; organization; facilities, instrumentation and equipment; and procedures.

3.2 Management Policy

The “Management Policy” section of NEI 07-03 states that plant management will issue written policy on radiation protection, consistent with RGs 8.8 and 8.10, which will include commitments to the following:

1) The design, construction and operation of the plant will be such that occupational and public radiation exposures and releases of licensed radioactive materials will be maintained ALARA.

2) Regulatory radiation requirements, dose limits, and limits on releases of radioactive materials will be complied with.

3) A radiation protection program will be implemented and maintained such that radiation doses will be kept below regulatory limits, as well as ALARA.

4) Each manager and supervisor in the plant organization will understand and be held accountable for implementing his or her responsibility to integrate radiation protection controls into work activities.

5) Each individual working at the facility will understand and accept the responsibility of following radiation protection procedures and instructions provided by radiation protection staff and of maintaining his or her dose ALARA.

6) The Radiation Protection Manager will be provided with the delegable authority to stop work or order an area evacuated when the radiation conditions warrant such an action and such actions are consistent with plant safety.

7) A direct reporting chain will be established from the Radiation Protection Manager to the Plant Manager that is independent of the reporting chains for Operations and Maintenance. This aspect of the radiation protection program is also addressed in the Technical Specifications (TSs) (i.e., Section 5.2, Organization) cited in Section 16.0 of DC and COL applications [References 5.4 and 5.5].

8) An ALARA committee will be established with delegated authority from the Plant Manager which will include, at a minimum, the managers of Operations, Maintenance, Work Control, Engineering and Radiation Protection to help assure effective implementation of line organization responsibilities for maintaining worker doses ALARA.

Based on the staff’s review of the “Management Policy” section of NEI 07-03 outlined above, the staff concludes that NEI 07-03 clearly and sufficiently describes, in terms of scope and level of detail, plant management written policy on radiation protection. This enables the staff to make a reasonable assurance finding of acceptability for issuance of a COL with verification, during the construction stage, of an operational radiation protection program which complies with the applicable regulations and guidance.

3.3 Organization

The “Organization" section of NEI 07-03 states that the qualification and training criteria for site personnel are described in FSAR Chapter 13 and are consistent with RG 1.8. Specific radiation program responsibilities are described for the following key positions within the plant organization:

- Plant Manager
- Plant Organizational Managers and Supervisors
- Radiation Protection Manager
- Radiation Protection Technicians
- Radiation Protection Supervisory and Technical Staff

3.3.1 Plant Manager

NEI 07-03 states that the Plant Manager will have overall responsibility for the plant, including responsibility for occupational and public radiation safety. His or her radiation protection responsibilities will be consistent with the guidance provided in RGs 8.8 and 8.10. In addition, the Plant Manager will be responsible for ensuring implementation of management radiation protection policy throughout the plant organization, ensuring the overall commitment to radiation protection by the plant organization, ensuring the establishment of an ALARA committee, supporting the Radiation Protection Manager with implementation of the Radiation Protection Program, assuring that exposures to site personnel are maintained ALARA, and other responsibilities as described in Section 12.5.2.1 of NEI 07-03.

3.3.2 Plant Organizational Managers and Supervisors

NEI 07-03 describes radiation protection responsibilities for managers and supervisors. These include establishing goals and expectations for his or her organization and reinforcing behaviors that promote radiation program. In addition, several specific responsibilities are listed for plant organization managers and supervisors including, for example, ensuring 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; ensuring that site personnel receive periodic training on radiation protection; notifying radiation protection personnel promptly when radiation protection problems occur or are identified; taking corrective actions; and resolving deficiencies associated with operations, procedures, systems, equipment, and work practices.

3.3.3 Radiation Protection Manager

The Radiation Protection Manager (RPM) will have direct responsibility for assuring adequate protection of the public health and safety, as well as the health and safety of personnel working at the plant during all aspects of activities covered within the scope and extent of the license. The RPM’s qualifications and experience will be consistent with the guidance in RG 1.8. The RPM will be responsible for tracking and analyzing trends in radiation work performance and taking necessary actions to correct adverse trends, for supporting the plant emergency preparedness program, for participating as a

member of the ALARA committee, and for other responsibilities as described in Section 12.5.2.3 of NEI 07-03 and consistent with the guidance provided in RGs 8.8 and 8.10.

3.3.4 Radiation Protection Technicians

NEI 07-03 states that the Radiation Protection Technicians (RPTs) will carry out responsibilities defined in the radiation protection program and procedures. Each operating shift will have at least one (1) RPT supplied onsite for each operating shift at all times starting with the initial loading of fuel in any reactor at the site (i.e., at least one RPT is required per site), in accordance with the TS (i.e., Section 5.0, Administrative Controls) cited in Section 16.0 of DCs and COL applications [References 5.3 and 5.4]. The qualifications and experience of RPTs will be consistent with the guidance in RG 1.8. RTPs will be trained and qualified under a program that will be established, implemented and maintained in accordance with 10 CFR 50.120. NEI 07-03 lists several specific radiation protection responsibilities that RPTs will be trained and qualified to implement. These include, for example, the authority (as delegated by the RPM) to stop work or order an area evacuated when the radiation conditions warrant such an action; providing job coverage and monitoring radiation conditions during jobs involving significant radiation exposure; assessing radiation conditions and establishing radiation protection requirements and appropriate controls for access to and work within all types of radiation areas; reviewing planned work and design modifications; providing personnel monitoring and bioassay services; operating, maintaining and calibrating radiation monitoring instrumentation and other responsibilities as delineated in Section 12.5.2.4 of NEI 07-03.

Some of these responsibilities may be modified by the COL applicant based on company or site specific information.

3.3.5 Radiation Protection Supervisory and Technical Staff

Radiation protection supervisory and technical staff will be 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 RG 1.8, will be assigned overall responsibility for each functional area. NEI 07-03 lists ten such functional areas, including, for example, Respiratory Protection and Personnel Dosimetry.

Responsibility for some of the functional areas may be assigned outside of the radiation protection department; however, the criteria for experience, training and qualification of staff responsible for the program will remain as described above.

Based on the staff's review of the "Organization" section of NEI 07-03 outlined above, the staff concludes that NEI 07-03 clearly and sufficiently describes, in terms of scope and level of detail, the radiation protection responsibilities, qualification and training criteria of site personnel associated with the operational radiation protection program to enable the staff to make a reasonable assurance finding of acceptability for issuance of a COL with verification, during the construction phase, of an operational radiation protection program which complies with the applicable regulations and guidance.

3.4 Facilities, Instrumentation and Equipment

This section of NEI 07-03 describes the facilities, instrumentation and equipment that will be used to support implementation of the radiation protection program during routine operations, refueling and other outages, abnormal occurrences, and accident conditions. The facilities, instrumentation and equipment described in NEI 07-03 will be consistent with the guidance in RGs 1.97, 8.2, 8.4, 8.6, 8.8, 8.9, 8.10, 8.15, 8.28, BTP 7-10 and the criteria in NUREG-0737, Items II.B.3 and III.D.3.3.

3.4.1 Facilities

NEI 07-03 provides a description of the following radiation protection facilities:

- Radiochemistry Laboratory
- Access Control Facility
- Personnel Decontamination Area
- Radiation Protection Offices
- Portable Instrument Calibration Facility
- Respiratory Facility
- Equipment Decontamination Facility
- Machine Shop for Activated/Contaminated Components and Equipment
- Storage and Issue Area for Contaminated Tools and Equipment
- Radioactive Materials Storage Area
- Facility for Dosimetry Processing and Bioassy
- Laundry Facility

Facility descriptions that were previously reviewed in an applicable design control document (DCD) may be incorporated by reference by the COL applicant. The COL applicant may also modify this section to indicate facilities that may be located off site and functions that may be carried out at another location or through a vendor.

3.4.2 Monitoring Instrumentation and Equipment

NEI 07-03 states that the applicant will select, maintain and use sufficient numbers and types of radiation monitoring instrumentation such that 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, are provided. NEI 07-03 describes the types and nominal characteristics of radiation protection program instrumentation that will be utilized, including laboratory and fixed instrumentation, portable monitoring instrumentation and equipment, and personnel monitoring instrumentation and equipment. Template NEI 07-03 calls out specific instrumentation needed for an operational radiation protection program, including, for example, laboratory analysis equipment to measure gamma, beta and alpha activity; whole-body counters; hand and foot monitors; small article monitors; beta-gamma survey meters with ranges adequate for normal operations, abnormal occurrences and accidents; count rate meters for alpha activity measurements; neutron survey instruments; portable air sampling and analysis systems to determine airborne radioiodine, radio halogen and particulate concentrations during and following an

accident; high and low volume air samplers for assessing airborne radioactivity concentrations; and portable continuous air monitors (CAMs). Characteristics of individual personnel dosimeters are also described and include dosimeters to measure gamma, beta and neutron radiation dose, dosimeters that provide real-time dose information, monitor extremity dose, monitor individual exposure to airborne radioactivity and/or alarm remotely and locally as needed by the situation. The information provided is consistent with the guidance provided in RG 1.97, Revision 4, and SRP BTP 7-10, as well as the criteria in NUREG-0737, Item III.D.3.3.

Additional or alternate instrumentation and equipment may be provided by the COL applicant based on company and site specific information.

3.4.3 Personnel Protective Clothing and Equipment

NEI 07-03 lists the types of personnel protective clothing and equipment that will be used, such as respirators, anti-contamination clothing, head covers, shoe covers, and other protective clothing and equipment. A sufficient inventory of serviceable personnel protective clothing and equipment will be maintained for use during plant operations, refueling and other outages, abnormal conditions, and accidents. Respirators used will be tested and certified for use by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH), or otherwise approved by the NRC. Other protective equipment, such as temporary shielding, and portable ventilation systems with high-efficiency particulate air (HEPA) filters, are also listed as equipment that will be used as required.

Based on the staff's review of the "Facilities, Instrumentation and Equipment" section of NEI 07-03 outlined above, the staff concludes that NEI 07-03 clearly and sufficiently describes, in terms of scope and level of detail, the facilities, instrumentation and equipment associated with the operational radiation protection program to enable the staff to make a reasonable assurance finding of acceptability for issuance of a COL with verification, during the construction stage, of an operational radiation protection program which complies with the applicable regulations and guidance.

3.5 Procedures

The "Procedures" section of NEI 07-03 commits to preparing procedures for radiation protection that will be consistent with the guidance provided in RGs 1.8, 8.2, 8.7, 8.8, 8.10, and the guidance referenced in NUREG-1736 that is applicable to power reactors. This approach complies with the requirements specified in Section 5.4, "Procedures, of the Technical Specifications" cited by the DC and the COL applicants [References 5.4 and 5.5]. The radiation protection procedures will be established, implemented and reviewed against the quality assurance criteria described by the COL applicant in their FSAR. Prior to initial receipt of any by-product, source, or special nuclear material, and thereafter whenever there is reactor fuel onsite, procedures will be established, implemented and maintained sufficient to provide adequate control over the receipt, possession, use, transfer, and disposal of byproduct, source, and special nuclear materials and assure compliance with the applicable portions of 10 CFR Parts 19, 20, 30, 40, 50, 70, and 71. The procedures as described will be implemented by staff trained and qualified in accordance with the requirements of 10 CFR 50.120 and consistent with the guidance in RGs 1.8, 8.13, 8.27, and 8.29.

3.5.1 Radiological Surveillance Procedures

NEI 07-03 states that radiological surveillance procedures will comply with 10 CFR 20.1501 and be established implemented and maintained consistent with the guidance in RGs 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. NEI 07-03 describes guidelines for frequency, extent and types of surveys to be performed; selection, calibration, maintenance and operational checks for radiation monitoring equipment; as well as recordkeeping requirements and posting guidelines associated with the performance of routine surveys. Emergency procedures will include provisions for use of appropriate equipment 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. Emergency procedures will also describe methods for taking and analyzing samples during and following an accident.

3.5.2 Methods to Maintain Exposures ALARA

Methods to maintain exposures ALARA in accordance with RGs 8.8 and 8.10 will be included in radiation protection procedures, as well as applicable operating and maintenance procedures. Examples of the types of methods that will be used to maintain exposures ALARA are discussed for the following operational categories:

- Refueling
- In-service Inspection
- Radwaste Handling
- Spent Fuel Handling
- Normal Operation
- Routine Maintenance
- Sampling
- Calibration

Site or company specific information may be provided to describe alternate or additional procedures for maintaining exposures ALARA.

3.5.3 Posting and Labeling

NEI 07-03 states that procedures will be established, implemented and maintained for posting areas and labeling containers based on current radiation and/or contamination survey results, in accordance with the requirements of 10 CFR 20.1901, 20.1902, 20.1903, 20.1904, and 20.1905. This section of NEI 07-03 also defines “posted areas.”

3.5.4 Access Control

Procedures for access control will be consistent with the guidance in RG 8.38 and assure compliance with 10 CFR 20.1902, 20.1903, 20.1601 and 20.1602. As in alternative to demonstrating compliance with the controls specified in 10 CFR 20.1601(a) and (b), and in accordance with 10 CFR 20.1601(c), an applicant

may incorporate Standard Technical Specification Section 5.7, High Radiation Areas (References 5.4 and 5.5), into the TS cited in Section 16.0 of their DC and COL applications.

This section of NEI 07-03 describes how access to posted areas (Radiation Areas, High Radiation Areas, Very High Radiation Areas, Contaminated Areas, Radioactive Materials Areas and Airborne Radioactivity Areas) will be restricted and controlled. It also describes how individuals in need of unescorted access to posted areas will require instruction and training in accordance with 10 CFR 19.12 and consistent with the guidance provided in RGs 8.13, 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 Part 73. A radiological controlled area (RCA) with access control points will be established to encompass the plant building complex to enhance control over access to such areas. Individual access to the security area, RCA, or a Radiation or Radioactive Materials Area will be at the discretion of Radiation Protection, require the use of a radiation work permit (RWP), and be contingent on the individual or an escort being instructed and trained in accordance with the requirements of 10 CFR 19.12 and the guidance in RGs 8.13, 8.27, and 8.29.

Each COL applicant will demonstrate compliance with 10 CFR 20.1602 by including in their application a description of each Very High Radiation Area and associated additional administrative controls for restricting access to each Very High Radiation Area. Site specific information that the applicant will provide to supplement the template, and which will be reviewed separately by the NRC staff, include:

- A description of each Very High Radiation Area, including reasons for accessing these areas.

- The location of each Very High Radiation Area in plant layout diagrams in FSAR Section 12.3-4.

- Anticipated frequency of accessing each of the Very High Radiation Areas, including a description of the additional administrative controls to be employed for restricting access to each Very High Radiation Area as required by 10 CFR 20.1602 and consistent with the guidance of RG 8.38.

- Detailed drawings for each Very High Radiation Area in FSAR Sections 12.3-4 that indicate physical barriers sufficient to thwart undetected entry, or an explanation of how such barriers to the Very High Radiation Areas will be verified in the final design of the facility.

3.5.5 Radiation Work Permits

Procedures governing the use of radiation work permits (RWPs) will be consistent with the guidance in RG 8.8. A radiation work permit, which is issued by Radiation Protection, will be required for access to and work within any posted area. NEI 07-03 describes the minimum amount of information that will be provided in each RWP.

3.5.6 Personnel Monitoring

NEI 07-03 states that personnel monitoring procedures will be in accordance with the requirements of 10 CFR Parts 19 and 20 and consistent with the guidance in RGs 8.2, 8.7, 8.9, 8.13, 8.34, 8.35, and 8.36.

This section of NEI 07-03 describes requirements for monitoring and reporting the external and internal occupational dose of individuals, along with requirements for documenting, reporting and maintaining personnel monitoring records, and documenting and maintaining records associated with the testing, calibration, processing, and maintenance of instrumentation and equipment used for personnel monitoring.

Individuals entering the Radiation Control Area (RCA) or a posted area that are required to be monitored in accordance with 10 CFR 20, will be monitored using an individual monitoring device appropriate to the external radiation he or she will be exposed to. If the individual monitoring device is not capable of providing real-time dose information, NEI 07-03 states that an additional method of monitoring the individual's dose will be provided such that real-time dose is known. Individuals accessing the RCA or a posted area on an escorted basis are monitored using an individual monitoring device worn by the individual or an individual monitoring device worn by the escort.

Each individual monitoring device that requires processing will be processed and evaluated by a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited processor, except for those devices excluded by 10 CFR 20.1501(c). Each device will be processed and evaluated according to the types and ranges of radiation being monitored with the device.

Individuals whose internal dose is required to be monitored in accordance with 10 CFR Part 20, who have accessed an Airborne Radioactivity Area, or who wear a respirator for radiation protection purposes, will be monitored by means sufficient to identify and quantify intakes in order to estimate his or her internal dose (committed effective dose equivalent or committed dose equivalent). Individuals who are suspected of having received an intake will be evaluated to quantify the intake, if any, in order to estimate internal dose. Situations that may result in an abnormal or inadvertent intake are also evaluated for the need to monitor internal dose.

3.5.7 Dose Control

NEI 07-03 states that regulatory dose limits will be complied with by establishing, implementing and maintaining, to the extent practical, procedures and engineered controls based on sound RP principles in order to keep occupational doses and doses to members of the public ALARA. Procedures will be established that are in accordance with 10 CFR 20.1101 and consistent with the guidance in RGs 8.8, 8.10, and 8.35. Examples of such procedures are described in NEI 07-03 for construction, pre-operational and operational phases, and include procedures for design, plant modifications, equipment selection, maintenance, repair, surveillance, refueling, and other activities that may involve significant exposures.

3.5.8 Contamination Control

Contamination control procedures will be established by the COL holder for the purpose of preventing the unauthorized release of radioactive materials to unrestricted areas and to help assure compliance with 10 CFR Parts 20.1406 and 20.1701.

Areas, items and personnel will be 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. Other methods of controlling contamination, such as labeling contaminated areas and items, using protective clothing and equipment as appropriate to the circumstances to prevent personal contamination, decontaminating personnel, areas and items, limiting access to contaminated areas, and preventing cross contamination of nonradioactive systems will also be used as described in NEI 07-03. NEI 07-03 includes a listing of practical measures to prevent the spread of contamination.

3.5.9 Respiratory Protection

Respiratory protection procedures will assure compliance with 10 CFR 20, Subpart H, and will be established, implemented and maintained consistent with the guidance in RG 8.15 to cover the following activities:

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

In addition, management policy will be established on the appropriate use of respiratory protection, as well as process and engineering controls to minimize airborne radioactivity. When the use of engineering controls as described in NEI 07-03 is not practical, the COL holder will control access to and limit stay times in Airborne Radioactivity Areas and/or require the use of respiratory protection equipment or other controls.

The COL holder will give the Radiation Protection Manager the responsibility of assigning to a single individual, knowledgeable in the area of respiratory protection consistent with the guidance in RG 8.15, the overall responsibility to establish and maintain a respiratory protection program and procedures that include the following:

- Air sampling and monitoring sufficient to identify hazards, select proper equipment, and determine doses from intakes;
- Conducting surveys and bioassays as necessary to evaluate actual intakes; and
- Testing respirators for operability immediately prior to each use.

In addition, the COL holder will select and use NIOSH or NRC approved respiratory equipment, will ensure individuals are medically certified for respiratory use prior to being fit-tested, will ensure individuals receive relief from respirator use as appropriate, will select and use respiratory protective equipment taking into account appropriate provisions as described in NEI 07-03, and will ensure standby rescue persons will be available for circumstances when respiratory protection equipment is used from which an unaided individual would have difficulty extricating himself or herself.

3.5.10 Radioactive Material Control

Procedures will be established, implemented and maintained to assure positive control over licensed radioactive material in accordance 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, 20.2201, and 10 CFR 71.5

3.5.11 Radiation Protection Training

Prior to the initial receipt of by-product, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18) procedures will be developed, implemented, and maintained that will assure that selection, qualification, initial training, and periodic retraining of radiation protection staff and radiation workers will be consistent with the guidance in RGs 1.8, 8.13, 8.15, 8.27, and 8.29 and be in accordance with 10 CFR 19, 20, and 10 CFR 50.120.

3.5.12 Quality Assurance

The radiation protection program and procedures will be established, implemented and reviewed under an ongoing quality assurance program consistent with the requirements of 10 CFR 20.1101 and site specific quality assurance criteria. The COL applicant will supplement NEI 07-03 with a reference to the appropriate section of their FSAR which contains the quality assurance criteria applicable to the Radiation Protection Program.

Consistent with the requirements in 10 CFR 71.101(f), quality assurance requirements will also apply to the program, procedures and activities involving the transportation of radioactive material.

3.5.13 Reports

Procedures will be established, implemented and maintained such that reports and notifications will be made in accordance with 10 CFR 20, Subpart M.

Based on the staff's review of the "Procedures" section of NEI 07-03 outlined above, the staff concludes that NEI 07-03 clearly and sufficiently describes, in terms of scope and level of detail, the procedures associated with: radiological surveillances, methods to maintain exposures ALARA, posting and labeling, access control, radiation work permits, personnel monitoring, dose control, contamination control, respiratory protection, radioactive material control, radiation protection training, quality assurance, and reports, to enable the staff to make a reasonable assurance finding of acceptability for issuance of a COL with verification, during the construction stage, of an operational

radiation protection program which complies with the applicable regulations and guidance.

4.0 CONCLUSION

Health Physics Branch (CHPB) staff used the acceptance criteria of SRP Section 12.5 as the basis for evaluating the acceptability of NEI 07-03, "Generic FSAR Template Guidance for Radiation Protection Program Description," Revision 7. The CHPB staff has determined that NEI 07-03 is consistent with the regulatory requirements, guidance, and industry standards for operational radiation protection programs as outlined in Section 2.0 of this evaluation, with implementation in accordance with the 4 milestones described in Section 3.0, and verification of the program during the construction stage.

The objectives of the radiation Protection Program are to provide reasonable assurance that the limits of 10 CFR 20.1201, 10 CFR 20.1202, 10 CFR 20.1203, 10 CFR 20.1204, 10 CFR 20.1207, and 10 CFR 20.1208 will not be exceeded; and to ensure that individual occupational radiation exposures are maintained as far below regulatory limits as is reasonably achievable and that total person-rem doses are ALARA, in accordance with the requirements of 10 CFR 20.1003 and the guidelines of RGs 8.8 and 8.10.

The Radiation Protection Manager (or equivalent), will report directly to the Plant Manager, independent of the reporting chains for Operations and Maintenance. The duties of the plant Radiation Protection Manager are in accordance with the guidance in RGs 8.8 and 8.10. The radiation protection organizations, qualifications, personnel training, program objectives, and implementation methods, as described in NEI 07-03, will be in accordance with the guidance in RGs 1.8, 8.2, 8.8, 8.10, and 8.13 and will comply with 10 CFR 19.12 and the Technical Specifications (Section 5.1, Organization, and Section 5.4, Procedures) cited in Section 16.0 of the DC and COL applications [References 5.4 and 5.5].

The radiation protection facilities described in NEI 07-03 are in accordance with the guidelines contained in RG 8.8.

Equipment to be used for radiation protection purposes includes portable radiation survey instruments, personnel monitoring equipment, portable area and airborne radioactivity monitors, laboratory equipment, air samplers, respiratory protective equipment, and protective clothing. The template commits the applicant to providing adequate numbers and types of equipment, and providing accident instrumentation that meet the criteria of RG 1.97 and SRP BTP 7-10, such that NRC staff have reasonable assurance that the applicant will be able to maintain occupational exposures ALARA.

All permanent and temporary plant personnel will be assigned individual personnel dosimeters to be worn in restricted areas at all times. A processor accredited under NVLAP will process these badges as appropriate. All personnel who are required to be monitored must wear direct reading dosimeters when entering radiologically controlled areas. Plant visitors wear self-reading dosimeters or are escorted by an individual wearing such personnel dosimetry devices. Appropriate caution signs, labels, and signals will be provided in accordance with 10 CFR 20.1601, 10 CFR 20.1602, 10 CFR 20.1901, 10 CFR 20.1902, 10 CFR 20.1903, 10 CFR 20.1904, and 10 CFR 20.1905. Neutron film badges, neutron dosimeters, and alarm dosimeters will also be provided for personnel when necessary.

Whole body counts of all plant personnel as well as other bioassays will be provided when deemed necessary by the Radiation Protection Manager (or equivalent), in order to maintain doses below the limits specified in 10 CFR 20.1201, 10 CFR 20.1202, 10 CFR 20.1203, 10 CFR 20.1204, 10 CFR 20.1206, 10 CFR 20.1207, and 10 CFR 20.1208. Performance, recording and reporting of surveys, personnel monitoring, and bioassays, as well as maintaining records of waste disposal, will be conducted in accordance with 10 CFR 20.1501, 10 CFR 20.1502, 10 CFR 20.2101-20.2108, 20.2110, 10 CFR 20.2201, 20.2202, 20.2203, 20.2204, 20.2205 and 10 CFR 20.2206, as well as RG 8.7. All radiation exposure information will be processed and recorded in accordance with 10 CFR Part 20.

The staff reviewed the Template NEI 07-03 description of maintenance, repair, surveillance, and refueling procedures and methods to ensure that all plant radiation protection procedures, practices, and criteria have been considered and that occupational radiation exposures will be ALARA and in accordance with RG 8.8. Procedures will also be developed to ensure that plant or visitor personnel to the site do not exceed exposure limits, to administer and control conditions of radiation work permits, to post radiation areas, to establish radiation access control zones, to control all radioactive material entering or leaving the plant site, and to train plant and visitor personnel in radiation protection policies and procedures. Procedures will be established, implemented and reviewed under an ongoing quality assurance program consistent with the requirements of 10 CFR 20.1101 and 10 CFR 71.101.

Storage and control of licensed materials in unrestricted areas will be maintained in accordance with 10 CFR 20.1801, 10 CFR 20.1802, 10 CFR 20.1901, and 10 CFR 20.1902. Access control to high radiation areas will be maintained in accordance with 10 CFR 20.1601. As an alternative to compliance with 10 CFR 20.1601(a) and (b), the applicant may choose to incorporate Section 5.7, “High Radiation Areas, of the Standard Technical Specifications” [References 5.4 and 5.5] into the technical specifications cited in Section 16.0 of their DC and COL applications. Compliance with the very high radiation area controls specified in 10 CFR 20.1602 will be demonstrated by additional information to be provided by the COL applicant.

On the basis of its review, the staff concludes that NEI 07-03, “Generic FSAR Template Guidance for Radiation Protection Program Description,” Revision 7, as supplemented by the COL applicant, sufficiently describes the programmatic elements and operational objectives to enable a reasonable assurance finding of acceptability for issuance of a COL, followed with verification of the implementation of a site and plant-specific operational radiation protection program through the inspection process prior to fuel load. The staff further concludes that NEI 07-03 is adequate and may be referenced in a COL application, and that the implementation of a plant and site-specific operational radiation protection program will be executed by COL holders in accordance with the milestones described in COL Safety Analysis Report Section 13.4 and the associated license conditions.

Accordingly, the NEI 07-03 Template fulfills a licensing requirement for submission of a COL application. A license condition will specify the timing for the licensee to make elements of the site and plant-specific operational radiation protection program available for NRC inspection and verification. Finally, under the requirements of SECY 05-0197, the implementation of operational programs identified in the NEI 07-03 Template does not necessitate inspection, test, analysis, and acceptance criteria in a DC or COL application.

5. REFERENCES

5.1 NEI New Plant Radiation Protection Task Force, Nuclear Energy Institute, to the U.S. NRC, NEI 07-03, " Generic FSAR Template Guidance for Radiation Protection Program Description," November 2008.

5.2 NUREG-0800, "SRP," Section 12.5, "Operational Radiation Protection Program," March 2007.

5.3 RG 1.206, "Combined License Applications for Nuclear Power Plants," Section 12.5, "Operational Radiation Protection Program," June 2007.

5.4 NUREG-1431, "Standard Technical Specifications for Westinghouse Plants," Revision 3, June 2004.

5.5 NUREG-1434, "Standard Technical Specifications for General Electric Plants, BWR/6," Revision 3, June 2004.

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APPENDIX B
NRC REQUESTS FOR ADDITIONAL INFORMATION AND NEI RESPONSES

July 9, 2007

Adrian P. Heymer, Senior Director
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1776 I Street, NW, Suite 400
Washington, DC 20006-3708

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING TOPICAL REPORT NO. NEI 07-03, GENERIC FSAR TEMPLATE GUIDANCE FOR RADIATION PROTECTION PROGRAM DESCRIPTION, REVISION 0 (PROJECT NO. 689; TAC MD5248)

Dear Mr. Heymer:

By letter dated April 12, 2007, the Nuclear Energy Institute (NEI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review its proposed Generic Final Safety Analysis Report (FSAR) Template Guidance for Radiation Protection Program Description, Revision 0. In a letter dated May 14, 2007, the NRC accepted NEI 07-03 for review. The staff has determined that additional information is necessary to complete its review. On May 25, 2007, an electronic copy of the enclosed request for additional information (RAI) was transmitted to Ralph Andersen of NEI. Although this RAI was provided electronically to you earlier than our scheduled date of May 30, 2007, we will not expect a response until 30 days following the scheduled date of issuance; therefore, please let me know if you will not be able to provide your written reply on or before June 29, 2007.

If you have any questions or comments regarding this matter, I may be reached at (301) 415-8488, JLS1@nrc.gov.

Sincerely,

/RA/

Joelle L. Starefos, Senior Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Project No. 689

Enclosure:
As stated

cc w/encl: See next page

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Washington, DC 20006-3708

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING TOPICAL REPORT NO. NEI 07-03, GENERIC FSAR TEMPLATE GUIDANCE FOR RADIATION PROTECTION PROGRAM DESCRIPTION, REVISION 0 (PROJECT NO. 689; TAC MD5248)

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Joelle L. Starefos, Senior Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Project No.: 689

Enclosure:
As stated

cc w/encl: See next page

ADAMS ACCESSION NO.: ML071450414 NRR-088

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NAME	KGoldstein	JStarefos	TFrye		SCoffin
DATE	05/30/07	05/30/07	05/30/07	06/12/07	07/09/07

OFFICIAL RECORD COPY

REQUEST FOR ADDITIONAL INFORMATION REGARDING

NUCLEAR ENERGY INSTITUTE (NEI) TOPICAL REPORT NEI 07-03, REVISION 0,

"GENERIC FSAR TEMPLATE GUIDANCE FOR RADIATION PROTECTION PROGRAM

DESCRIPTION"

1. The "Operational Radiation Protection Program" sections of Draft Guide-1145 (Regulatory Guide (RG) 1.206) and the Standard Review Plan (SRP) (NUREG-0800) refer to several guidance documents that provide guidelines for an acceptable operational radiation protection program. In general, most of this guidance is explicitly called out in Nuclear Energy Institute (NEI) 07-03. However, the staff has noted the following omissions in NEI 07-03:

    - Regulatory Guide 8.25, "Air Sampling in the Workplace,"
    - NUREG/CR-0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials,"
    - Memorandum from Larry W. Camper to David B. Matthews and Elmo E. Collins, "List of Decommissioning Lessons Learned in Support of the Development of Standard Review Plan for New Reactor Licensing," October 10, 2006 (Agencywide Document Access and Management System (ADAMS) Accession No. ML062620355).

    Please incorporate the above guidance documents into the appropriate section of NEI 07-03 or provide justification as to why these references should not be included in NEI 07-03.

2. The SRP references the following standards in Section 12.5, "Operational Radiation Protection Program":

    - ANSI/ANS 3.1-1993 R99, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants,"
    - ANSI/HPS N13.6, "Practice for Occupational Radiation Exposure Records Systems,"
    - ANSI/HPS N13.11-2001, "Personnel Dosimetry Performance-Criteria for Testing,"
    - ANSI/HPS N13.14-1994, "Internal Dosimetry Programs for Tritium Exposure-Minimum Requirements,"
    - ANSI/HPS N13.30-1996, "Performance Criteria for Radiobioassay,"

Enclosure

- ANSI/HPS N13.42-1997, “Internal Dosimetry for Mixed Fission Activation Product,”
- ANSI IEEE 309-1991, “Test Procedure for Geiger-Mueller Counters,”
- ANSI N42.20-2003, “Performance Criteria for Active Personnel Radiation Monitors,”
- ANSI N42.28-2002, “American National Standard for Calibration of Germanium Detectors for In Situ Gamma Ray Measurements,”
- ANSI N42.17A-1989, “Performance Specifications for Health Physics Instrumentation-Portable Instrumentation for Use in Normal Environmental Conditions,”
- ANSI N323A-1997, “American National Standard Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments.”

Please incorporate the above listed ANSI standards into NEI 07-03 as references, or provide justification as to why these standards have been omitted from NEI 07-03.

3. (12.5) NEI 07-03 does not reference 10 CFR 20, Subpart B entitled “Radiation Protection Programs.” In order to include this reference, consider adding the following phrase preceding the second paragraph in 12.5 (prior to the words “The purpose of”), “In accordance with 10 CFR 20, Subpart B,”

4. (12.5) In the description of Milestone 2 (“Prior to receiving reactor fuel under this license”), reference is made to providing radiation monitoring in accordance with 10 CFR 50.68. Compliance with 10 CFR 50.68 requires the establishment and implementation of plant procedures relating to criticality accident requirements in addition to the use of radiation monitoring equipment. Modify item 2 under the milestone section of 12.5 to add the words, “plant procedures on criticality accident requirements will be established, implemented, and maintained and” prior to the words “radiation monitoring.”

5. (12.5) In the section describing the four different milestones, no specific mention is made of when the position of radiation protection manager (RPM) should be filled. It can be inferred from the text that this position should be filled prior to initial loading of fuel in the reactor (milestone 3). The description of milestone 3 should be modified to specifically state that the RPM position will be filled during this milestone stage.

6. (12.5.1) In the list of management commitments listed, the establishment of an as low as is reasonably achievable (ALARA) Committee is listed as an option (item 8). The establishment of an ALARA Committee (or similarly named committee with similar functions) is an important part of an effective radiation protection program and should not be listed as an optional management commitment. Please reflect this committee as part of the main list of management commitments.

7. (12.5.2.1) The same comment (see #6 above) applies to listing the establishment of an ALARA Committee as an optional responsibility of the Plant Manager. RG 8.8 states that the RPM should have direct recourse to responsible management and making the ALARA Committee one of the responsibilities of the Plant Manager would be one way to establish such a link between the RPM and Plant Manager.

8. (12.5.2.3) The same comment (see #6 above) applies to participating as a member of the plant ALARA Committee as an optional responsibility of the Radiation Protection Manager. RG 8.8 states that the RPM should have direct recourse to responsible management and making the ALARA Committee one of the responsibilities of the RPM would be one way to establish such a link between the RPM and Plant Manager.

9. (12.5) For all Regulatory Guides referenced in NEI 07-03, please specifiy the revision number.

10. (12.5.3.2) In the list of “Personnel Monitoring Instrumentation and Equipment” there is no mention of remote and local reading alarm dosimeters (which may be coupled with direct or electronic surveillance equipment) for monitoring workers in high-dose/high-dose-rate environments. Please include “remote and local reading alarm dosimeters (which may be coupled with direct or electronic surveillance equipment, as necessary)” in the list as an example of Personnel Monitoring Instrumentation or provide justification as to why these dosimeters should not be listed.

11. (12.5.3.2) The nominal range shown for the neutron survey instruments listed under "Portable Monitoring Instrumentation and Equipment" is 0 - 5 rem/hr. Compared to the nominal ranges given for the other portable instrumentation, the upper range of 5 rem/hr seems low. Please justify why this is an appropriate nominal range for a neutron survey instrument.

12. (12.5.4.4) The third paragraph in this section makes reference to 10 CFR 20.1903. Should this reference be 10 CFR 20.1602, which describes the additional administrative controls for restricting access to Very High Radiation Areas?

13. (12.5.4.7) The first paragraph in this section states that the requirements of 10 CFR 20.1301 will be met. Please indicate in the text that the requirements of 10 CFR 20.1302 will also be met, as they relate to controlling the maximum dose rate in unrestricted areas.

14. (12.5.4.7) The first paragraph states that the requirements of 10 CFR 20.1201 will be complied with. However, no mention is made of 10 CFR 20.1202, 20.1203 or 20.1204. Please reflect the commitment to meet the requirements of 20.1201, 20.1202, 20.1203, and 20.1204, as they relate to demonstrating compliance with internal and external dose limits, in this section.

15. (12.5.4.8) In the sixth paragraph of this section, please change the following sentence “Practical measures are implemented to prevent the spread of contamination, including, for example:” to “Practical measures are implemented to prevent the spread of contamination, including:”

16. (12.5.4.10) In the list of regulations for this section no mention is made of 10 CFR 20.2201, “Reports of theft or loss of licensed material.” Please indicate if procedures will be in compliance with this regulation by adding 20.2201 to the existing list.

Editorial Changes
Consider the following editorial changes as shown in **Bold**:

E1. (12.5) In the paragraph describing the purpose of the radiation protection program, please correct as follows: “...as low as **is** reasonably achievable (ALARA).”

E2. (12.5) In the paragraph describing Milestone 3, please change the first sentence to read, “Prior to initial loading of fuel in the reactor, the **radiation protection** program.”

E3. (12.5.1) Please change item number 7 of this section so that it reads as follows: “Establish a direct reporting chain of the Radiation Protection Manager to the Plant Manager that is **at the same reporting level as, but** independent of, the reporting chains for Operations and Maintenance.”

E4. (12.5.2.3) Please modify item number 3 in this section as follows: “Provide radiation protection input to facility design**, including plant modifications**, and work planning;”

E5. (12.5.2.4) Please change the first sentence of the second paragraph as follows: “The qualifications and experience of RPTs are consistent with the guidance **contained in** Regulatory Guide 1.8.”

E6. (12.5.2.4) Please modify the third paragraph in this section as follows: “...trained and qualified staff in Radiation Protection **(as described in section 12.5.2.5)** other than RPTs...”

E7. (12.5.3.1) In the section titled “Storage and Issue Area for Contaminated Tools and Equipment” please change the last sentence in that paragraph to: “Clean and contaminated tools and equipment **are** segregated to avoid cross-contamination.”

E8. (12.5.3.1) In the section titled “Facility for Dosimetry Processing and Bioassay” please change the first sentence to: “A facility or facilities are provided to support processing of dosimetry and **performance** of bioassay...”

E9. (12.5.3.1) In the section titled: “Laundry Facility” please make the following change to the second sentence: “...applicable limits in 10 CFR Parts 20 and 50 and as low as **is** reasonably achievable...”

E10. (12.5.4.2) In the section titled: “Refueling” please change the last sentence to the following: “...the normal radiation level on the refueling bridge **during these operations** is expected to be less than 5 mrem/h.”

E11. (12.5.4.2) In the section titled: “Inservice Inspection” please change the first sentence in the following way: “...previous radiation and contamination surveys, **and/or** previous RWPs appropriate to the particular job to be performed.”

E12. (12.5.4.2) In the section titled “Radwaste Handling” please modify the last sentence in the paragraph in the following way: “The radwaste system is described in **FSAR C**hapter 11.”

E13. (12.5.4.2) Please reword the first two sentences of the section titled “Normal Operation” in the following way: “The plant was designed so that significant radiation sources are minimized, shielded, and/or **located** in cubicles. **Instrument readouts for** instrumentation required for normal operation**, for the most part, can be** read remotely **from** the control room or **from** other low radiation areas.”

E14. (12.5.4.2) The last sentence of the first paragraph under the section titled “Routine Maintenance” should be changed as follows: “This serves to minimize the time spent in the radiation area **and thereby minimize personnel dose**.”

E15. (12.5.4.2) The first sentence of the second paragraph of the “Routine Maintenance” section should be modified to “In addition, the **preventive** maintenance procedure...” The word “usual” should be deleted.

E16. (12.5.4.2) The second sentence of the second paragraph of the “Routine Maintenance” section should be modified to “...shielding is specified**,** if appropriate, and additional specific instructions...”

E17. (12.5.4.2) The first sentence of the third paragraph of the “Routine Maintenance” section should be modified as follows: “Extension tools are used when practical **to minimize dose when personnel are working on radioactive components/equipment**.”

E18. (12.5.4.2) The second to last sentence of the third paragraph of the “Routine Maintenance” section should be changed as follows: “...accomplished as safely and quickly as possible, and what the acceptance criteria **for completing the job** are.”

E19. (12.5.4.4) The second sentence of the third paragraph should be modified as follows: “...restricting access to each Very High Radiation Area as required by 10 CFR 20.**1602.**”

E20. (12.5.4.7) Please change the second paragraph of this section as follows:

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

E21. (12.5.4.7) Please change the second sentence in the paragraph marked by the number 3 in the following way: “The briefing**s** are intended to assure that personnel understand...”

E22. (12.5.4.8) Please change the fourth and fifth bullets in this section in the following way: “Containments, caches and enclosures are used during maintenance, repairs, and testing**,** when practical**,** to contain spills and releases;” and “Engineering controls**,** such as portable ventilation or filtration units to reduce concentrations of radioactivity in air or fluids, are used where practical;”

E23. (12.5.4.8) Please change the seventh bullet in this section to read as follows: “...necessitate disposal as radioactive waste **is** minimized;”

cc:

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NUCLEAR ENERGY INSTITUTE

Russell J. Bell
DIRECTOR, NEW PLANT LICENSING
NUCLEAR GENERATION DIVISION

August 9, 2007

NRC Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20005-0001

Subject: Nuclear Energy Institute Response to Request for Additional Information Regarding Nuclear Energy Institute Topical Report NEI 07-03, Revision 0, "*Generic FSAR Template Guidance for Radiation Protection Program Description*," dated March 2007.

Project Number: 689

The Nuclear Energy Institute (NEI) provides this response to the subject Request for Information (RAI). The RAI contains 16 questions and recommendations for changes to NEI Topical Report 07-03, Revision 0, as well as 23 suggested editorial changes to improve the clarity and consistency of the document.

NEI utilized an industry task force, made up of nuclear power plant radiation protection and low-level radioactive waste program managers, licensing staff, and representatives from industry Design-Centered Working Groups (DCWG) and nuclear power plant vendor companies, to help review the RAI and provide input to our response to questions and comments contained in the RAI.

Enclosure 1 contains specific responses to the 16 questions and recommendations contained in the RAI. Please note that we have accepted and incorporated into NEI Topical Report 07-03 the comments and recommendations provided by NRC staff for 13 of the 16 items contained in the RAI. The 3 remaining items fall into two areas:

- RAI 1 & 2 – We have not included additional references to specific regulatory guidance and ANSI standards in NEI 07-03 identified by the staff.
- RAI 11 – We have left unchanged the nominal range of 0-5 rem/hr for specific neutron survey instruments.

We have provided our justification for not making these changes to NEI Topical Report 07-03, consistent with the alternatives proposed by NRC staff for each of those items that NEI either incorporate the recommended change into the document or provide justification for not doing so.

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Enclosure 2A contains a revised version (Revision 1) of NEI Topical Report 07-03 that reflects our responses to the questions, as described in Enclosure 1, and incorporates all of the 23 suggested editorial changes contained in the RAI. Enclosure 2B contains a mark-up version of NEI Topical Report 07-03, Revision 1, in a "line-in/line-out" format, to help facilitate your review of the changes made to the document as a result of our response to the RAI.

If you have any questions regarding the above concerns, please do not hesitate to contact me at 202-739-8087; rjb@nei.org.

Sincerely,

Russell J. Bell

Enclosures

c: Mr. Patrick M. Madden, NRC
Mr. Michael A. Canova, NRC
Mr. Timothy J. Frye, NRC
Mr. William D. Reckley, NRC

Nuclear Energy Institute (NEI) Response to
NRC Request for Additional Information (RAI) Regarding
Nuclear Energy Institute Topical Report NEI 07-03, Revision 0,
"Generic FSAR Template Guidance for Radiation Protection Program Description,"

1. The "Operational Radiation Protection Program" sections of Draft Guide-1145 (Regulatory Guide (RG) 1.206) and the Standard Review Plan SRP (NUREG-0800), refer to several guidance documents which provide guidelines for an acceptable operational radiation protection program. In general, most of this guidance is explicitly called out in NEI 07-03. However, the staff has noted the following omissions in NEI 07-03:

    a. Regulatory Guide 8.25 "Air Sampling in the Workplace,"
    b. NUREG/CR-0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials,"
    c. Memorandum from Larry W. Camper to David B. Matthews and Elmo E. Collins, "List of Decommissioning Lessons Learned in Support of the Development of Standard Review Plan for New Reactor Licensing," October 10, 2006 (Agencywide Document Access and Management System (ADAMS) Accession No. ML062620355).

    Please incorporate the above guidance documents into the appropriate section of NEI 07-03 or provide justification as to why these references should not be included in NEI 07-03.

    NEI Response:

    NEI has not incorporated the above guidance documents into NEI 07-03 as references. Our justification for not doing so is as follows (for each of the three cited documents):

    a. The Introduction in Regulatory Guide 8.25, "Air Sampling in the Workplace," states:

        > "this guide does not apply to activities conducted under 10 CFR Part 50 at reactor facilities. Although the provisions of 10 CFR Part 20 apply equally to nuclear reactors and to other facilities, the air sampling programs of reactor licensees are well established, and the NRC is satisfied that the quality of air sampling at nuclear reactors is adequate. Therefore, no further guidance on air sampling is needed at this time for reactor licensees."

        This conclusion by the NRC staff in the regulatory guide was developed in response to extensive comments made by the nuclear energy industry on a draft version of the regulatory guide that was published for public comment. The industry comments described the scope of air sampling programs employed at nuclear power plants and highlighted the industry's exceptional performance in regard to protecting workers against significant intakes of airborne radioactive material. This level of performance is attributable to the extensive protective measures built into nuclear power plant design and operating procedures to control airborne radioactive material and minimize the potential for intakes, as well as reflecting the high quality of commensurate air sampling programs.

        NEI 07-03 contains a description of air sampling programs and operational measures to monitor and control airborne radioactive material and prevent intakes at new nuclear power plants that is reflective of the "well-established" programs being

employed at currently operating plants. In addition to NEI 07-03, Chapter 12 of an FSAR supporting a Construction and Operating License (COL) application contains details of plant and system designs, either by reference to a certified design or as described in the FSAR, that serve to limit airborne radioactive material in occupied areas and minimize the potential for intakes.

The descriptive information provided in the COL application, including NEI 07-03, is commensurate with the level of detail provided in support of previous power reactor operating license (OL) applications and provides reasonable assurance that the air sampling programs at new nuclear power plants are adequate, as has been concluded by the NRC staff in Regulatory Guide 8.25 in regard to currently operating plants.

Therefore, we have not included a commitment to Regulatory Guide 8.25 in NEI 07-03.

b. Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection," states in the Introduction that the guide "describes a respiratory protection program that is acceptable to the NRC staff." Further, the Discussion in the guide notes that "[m]ore detailed advice and technical information can be found in NUREG-0041, 'Manual of Respiratory Protection Against Airborne Radioactive Materials.'" In fact, the Regulatory Position in the Regulatory Guide is largely based on the detailed advice and technical information contained in NUREG-0041, but the Regulatory Guide is adequate as a "stand-alone" document to serve as guidance to licensees, as well to provide appropriate acceptance criteria to the staff for conducting a review of a respiratory protection program described in a COL FSAR. The information in the NUREG itself is useful in providing technical details supporting the regulatory guide, but is not necessary to serving as specific criteria for evaluating a respiratory protection program as described in a COL FSAR.

   The information in NEI 07-03 regarding the respiratory protection program includes a commitment that the program conforms with the guidance in Regulatory Guide 8.15, as well as a detailed description of required program elements that is derived from the regulatory guide. The level of descriptive detail about the respiratory protection program, in addition to a specific commitment to Regulatory Guide 8.15, is sufficient to support a finding of reasonable assurance that the respiratory protection program complies with NRC requirements and serves to adequately protect worker health and safety.

   Therefore, we have not included a commitment to NUREG-0041 in NEI 07-03.

c. The memorandum cited in this item of the RAI conveys some decommissioning lessons learned in support of the development of the SRP in regard to the requirements contained in 10 CFR Part 20.1406. Subsequent to issuance of the memorandum, the NRC has determined that a regulatory guide will be developed to establish a regulatory position on demonstrating compliance with the respective regulation. The regulatory guide was published for public comment in July 2007 and, when finalized, will be factored into the SRP. The information provided in the memorandum may be incorporated into the final version of the regulatory guide in total, in part, or not at all.

In our view, the memorandum, in itself, does not constitute an approved regulatory position, even though it is listed as a reference in the SRP. Even from an informational perspective, the memorandum cannot be considered as complete or final in regard to what is necessary or adequate to demonstrate compliance with 20.1406 because the information in the publicly available draft of the proposed regulatory guide indicates that the regulatory perspective on this matter has already evolved well beyond that provided in the memorandum.

NEI 07-03 contains a commitment to 20.1406 and descriptive details about how the operational radiation protection program facilitates minimization of contamination that reflects industry's experience and lessons-learned from decommissioning, as well as the information provided in the memorandum, that is adequate to support a finding of reasonable assurance of compliance with NRC regulations and adequate protection of health and safety given the present state of the development of NRC regulatory position on this matter. To commit to the memorandum at this point seems to us to be premature and inappropriate because it will lack finality. At the time of issuance of an approved regulatory guide on 20.1406, we will consider how to update to NEI-07 to reflect an appropriate commitment to the regulatory guide.

Therefore, we have not included a commitment to the memorandum in NEI 07-03.

2. The SRP references the following standards in Section 12.5, "Operational Radiation Protection Program":

- ANSI/ANS 3.1-1993 R99, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants."
- ANSI/HPS N13.6, "Practice for Occupational Radiation Exposure Records Systems."
- ANSI/HPS N13.11-2001, "Personnel Dosimetry Performance-Criteria for Testing."
- ANSI/HPS N13.14-1994, "Internal Dosimetry Programs for Tritium Exposure-Minimum Requirements."
- ANSI/HPS N13.30-1996, "Performance Criteria for Radiobioassay."
- ANSI/HPS N13.42-1997, "Internal Dosimetry for Mixed Fission Activation Products."
- ANSI IEEE 309-1991, "Test Procedure for Geiger-Mueller Counters."
- ANSI N42.20-2003, "Performance Criteria for Active Personnel Radiation Monitors."
- ANSI N42.28-2002, "American National Standard for Calibration of Germanium Detectors for In Situ Gamma Ray Measurements."
- ANSI N42.17A-1989, "Performance Specifications for Health Physics Instrumentation-Portable Instrumentation for Use in Normal Environmental Conditions."
- ANSI N323A-1997, "American National Standard Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments."

Please incorporate the above listed ANSI standards into NEI 07-03 as references, or provide justification as to why these standards have been omitted from NEI 07-03.

NEI Response:

The RAI lists 11 American National Standards Institute (ANSI) standards that are included as references in Section 12.5 of NUREG-0800, "Standard Review Plan (SRP)," and recommends that the standards be incorporated into NEI 07-03, or that a justification be provided as to why the standards were omitted from NEI 07-03.

Some ANSI standards are endorsed in NRC regulatory guides, most often with a description of exceptions and clarifications, as a part of the Regulatory Position describing methods that are acceptable to NRC staff for demonstrating compliance with NRC regulations. ANSI standards, in themselves, are not regulatory documents, nor do they serve as *de facto* regulatory guidance on methods acceptable to NRC staff for demonstrating compliance with NRC regulations, except as stipulated and endorsed in an NRC regulatory guide or other appropriate regulatory document. As a general matter, references identified in the SRP should be consistent with references identified in the underlying regulatory guides.

Moreover, it is not clear if the staff intends that SRP references to these ANSI standards indicate NRC endorsement of them. In our view, including an ANSI standard in a list of references in the SRP does not constitute endorsement of the respective ANSI standard as part of an approved regulatory position of NRC staff, nor should it be implied that such a listing, in itself, of an ANSI standard means that the standard is necessary or sufficient to accept, review, or reach a finding of reasonable assurance of compliance with NRC regulations in regard to a COL application. In fact, reference in a COL application to an ANSI standard that has not been properly endorsed by the NRC would only be appropriate where the applicant is proposing to use the standard as an alternative to existing guidance or to address an area where no guidance currently exists.

NEI 07-03 contains commitments to all of the NRC regulations and respective regulatory guides that are applicable to operational radiation protection programs at nuclear power plants. Where such regulatory guidance already contains an endorsement of an ANSI standard listed in the RAI, the commitment implicitly includes the respective ANSI standard as it is endorsed in the guide, and no additional commitment directly to the ANSI standard is necessary, nor is it appropriate, unless all of the exceptions and clarifications included in the regulatory guide are either reiterated in the application or taken exception to, with an appropriate justification. Several of the ANSI standards listed in the RAI are endorsed in NRC regulatory guides and therefore the commitment to the regulatory guides satisfies the recommendation in the RAI.

The remaining ANSI standards are not endorsed in regulatory guides, and it must be assumed that the NRC has not yet established a regulatory position in regard to each of these standards. A wholesale commitment to these standards in the COL application would be inappropriate and inefficient, in that the NRC would need to evaluate, and, in effect, develop a regulatory position on each of the standards. Any exceptions or clarifications developed by the staff in regard to the standards would need to be subsequently incorporated into NEI 07-03.

NEI has provided in NEI 07-03, in addition to commitments to all of the regulations and regulatory guides applicable to operational radiation protection programs at

nuclear power plants, detailed descriptions of required program elements sufficient to support a finding of reasonable assurance of compliance with NRC regulations and adequate protection of worker and public health and safety.

Because of the ambiguous regulatory approval status of the identified ANSI standards, and for the other reasons discussed above, we have not included in NEI 07-03 commitments directly to the 11 ANSI standards listed in the RAI.

3. (12.5) NEI 07-03 does not reference 10 CFR 20, Subpart B entitled "Radiation Protection Programs." In order to include this reference, consider adding the following phrase preceding the second paragraph in 12.5 (prior to the words "The purpose of"), "In accordance with 10 CFR 20, Subpart B,..."

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

4. (12.5) In the description of Milestone 2 ("Prior to receiving reactor fuel under this license"), reference is made to providing radiation monitoring in accordance with 10 CFR 50.68. Compliance with 10 CFR 50.68 requires the establishment and implementation of plant procedures relating to criticality accident requirements in addition to the use of radiation monitoring equipment. Modify item 2 under the milestone section of 12.5 to add the words, "plant procedures on criticality accident requirements will be established, implemented, and maintained and" prior to the words "radiation monitoring."

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

5. (12.5) In the section describing the four different milestones, no specific mention is made of when the position of radiation protection manager (RPM) should be filled. It can be inferred from the text that this position should be filled prior to initial loading of fuel in the reactor (milestone 3). The description of milestone 3 should be modified to specifically state that the RPM position will be filled during this milestone stage.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

6. (12.5.1) In the list of management commitments listed, the establishment of an as low as is reasonably achievable (ALARA) Committee is listed as an option (item 8). The establishment of an ALARA Committee (or similarly named committee with similar functions) is an important part of an effective radiation protection program and should not be listed as an optional management commitment. Please reflect this committee as part of the main list of management commitments.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

7. (12.5.2.1) The same comment (see #6 above) applies to listing the establishment of an ALARA Committee as an optional responsibility of the Plant Manager. RG 8.8 states that the RPM should have direct recourse to responsible management and making the ALARA Committee one of the responsibilities of the Plant Manager would be one way to establish such a link between the RPM and Plant Manager.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

8. (12.5.2.3) The same comment (see #6 above) applies to participating as a member of the plant ALARA Committee as an optional responsibility of the Radiation Protection Manager. RG 8.8 states that the RPM should have direct recourse to responsible management and making the ALARA Committee one of the responsibilities of the RPM would be one way to establish such a link between the RPM and Plant Manager.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

9. (12.5.3) For all Regulatory Guides referenced in NEI 07-03, please specify the revision number.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

10. (12.5.3.2) In the list of "Personnel Monitoring Instrumentation and Equipment" there is no mention of remote and local reading alarm dosimeters (which may be coupled with direct or electronic surveillance equipment) for monitoring workers in high-dose/high-dose-rate environments. Please include "remote and local reading alarm dosimeters (which may be coupled with direct or electronic surveillance equipment, as necessary)" in the list as an example of Personnel Monitoring Instrumentation or provide justification as to why these dosimeters should not be listed.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

11. (12.5.3.2) The nominal range shown for the neutron survey instruments listed under "Portable Monitoring Instrumentation and Equipment" is 0 - 5 rem/hr. Compared to the nominal ranges given for the other portable instrumentation, the upper range of 5 rem/hr seems low. Please justify why this is an appropriate nominal range for a neutron survey instrument.

NEI Response:

NEI proposes to maintain the nominal range of 0 – 5 rem/hr. A review of previously submitted license applications, as well as discussions with existing operational nuclear power plant licensees, indicates that the typical range maintained for portable neutron survey instrumentation is not in excess of 0 – 5 rem/hr. Under expected operating conditions, including anticipated abnormal occurrences, scattered neutron radiation fields well below 5 rem/hour may be encountered during access into a reactor containment when the reactor is critical. Higher neutron radiation fields may exist directly over the reactor cavity when the reactor is at power, but this area is not accessed by personnel under such conditions. Therefore, it is not necessary to maintain portable neutron radiation survey instrumentation with a nominal range greater than 0 – 5 rem/hr. In addition, it would be unnecessarily difficult and costly to attempt to maintain the capability, either onsite or through contracted services, for periodic calibration and testing of portable neutron radiation survey instrumentation with a nominal range greater than 0 – 5 rem/hr because of the limited availability of properly certified neutron radiation sources that provide neutron radiation fields at levels greater than 5 rem/hr. Such a regulatory burden is not justified by industry experience or anticipated operating conditions.

12. (12.5.4.4) The third paragraph in this section makes reference to 10 CFR 20.1903. Should this reference be 10 CFR 20.1602, which describes the additional administrative controls for restricting access to Very High Radiation Areas?

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

13. (12.5.4.7) The first paragraph in this section states that the requirements of 10 CFR 20.1301 will be met. Please indicate in the text that the requirements of 10 CFR 20.1302 will also be met, as they relate to controlling the maximum dose rate in unrestricted areas.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

14. (12.5.4.7) The first paragraph states that the requirements of 10 CFR 20.1201 will be complied with. However, no mention is made of 10 CFR 20.1202, 20.1203 or 20.1204. Please reflect the commitment to meet the requirements of 20.1201, 20.1202, 20.1203, and 20.1204, as they relate to demonstrating compliance with internal and external dose limits, in this section.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

15. (12.5.4.8) In the sixth paragraph of this section, please change the following sentence "Practical measures are implemented to prevent the spread of contamination, including, for example:" to "Practical measures are implemented to prevent the spread of contamination, including:.."

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

16. (12.5.4.10) In the list of regulations for this section no mention is made of 10 CFR 20.2201 "Reports of theft or loss of licensed material." Please indicate if procedures will be in compliance with this regulation by adding 20.2201 to the existing list.

NEI Response:

NEI has incorporated the recommended change into NEI 07-03.

Editorial Changes

NEI Response:

NEI has incorporated all of the editorial changes listed in the RIA into NEI 07-03.

Consider the following editorial changes as shown in **Bold**:

E1. (12.5) In the paragraph describing the purpose of the radiation protection program, please correct as follows: "…as low as **is** reasonably achievable (ALARA)."

E2. (12.5) In the paragraph describing Milestone 3, please change the first sentence to read, "Prior to initial loading of fuel in the reactor, the **radiation protection** program...."

E3. (12.5.1) Please change item number 7 of this section so that it reads as follows: "Establish a direct reporting chain of the Radiation Protection Manager to the Plant Manager that is **at the same reporting level as, but** independent of, the reporting chains for Operations and Maintenance."

E4. (12.5.2.3) Please modify item number 3 in this section as follows: "Provide radiation protection input to facility design**, including plant modifications**, and work planning;..."

E5. (12.5.2.4) Please change the first sentence of the second paragraph as follows: "The qualifications and experience of RPTs are consistent with the guidance **contained in** Regulatory Guide 1.8."

E6. (12.5.2.4) Please modify the third paragraph in this section as follows: "...trained and qualified staff in Radiation Protection **(as described in section 12.5.2.5)** other than RPTs..."

E7. (12.5.3.1) In the section titled "Storage and Issue Area for Contaminated Tools and Equipment" please change the last sentence in that paragraph to: "Clean and contaminated tools and equipment **are** segregated to avoid cross-contamination."

E8. (12.5.3.1) In the section titled "Facility for Dosimetry Processing and Bioassay" please change the first sentence to: "A facility or facilities are provided to support processing of dosimetry and **performance** of bioassay..."

E9. (12.5.3.1) In the section titled: "Laundry Facility" please make the following change to the second sentence: "...applicable limits in 10 CFR Parts 20 and 50 and as low as **is** reasonably achievable..."

E10. (12.5.4.2) In the section titled: "Refueling" please change the last sentence to the following: "...the normal radiation level on the refueling bridge **during these operations** is expected to be less than 5 rem/h."

E11. (12.5.4.2) In the section titled: "Inservice Inspection" please change the first sentence in the following way: "...previous radiation and contamination surveys, **and/or** previous RWPs appropriate to the particular job to be performed."

E12. (12.5.4.2) In the section titled "Radwaste Handling" please modify the last sentence in the paragraph in the following way: "The radwaste system is described in **FSAR C**hapter 11."

E13. (12.5.4.2) Please reword the first two sentences of the section titled "Normal Operation" in the following way: "The plant was designed so that significant radiation sources are minimized, shielded, and/or **located** in cubicles. **Instrument readouts for** instrumentation required for normal operation**, for the most part, can be** read remotely **from** the control room or **from** other low radiation areas."

E14. (12.5.4.2) The last sentence of the first paragraph under the section titled "Routine Maintenance" should be changed as follows: "This serves to minimize the time spent in the radiation area **and thereby minimize personnel dose**."

E15. (12.5.4.2) The first sentence of the second paragraph of the "Routine Maintenance" section should be modified to "In addition, the **preventive** maintenance procedure..." The word "usual" should be deleted.

E16. (12.5.4.2) The second sentence of the second paragraph of the "Routine Maintenance" section should be modified to "...shielding is specified**,** if appropriate, and additional specific instructions..."

E17. (12.5.4.2) The first sentence of the third paragraph of the "Routine Maintenance" section should be modified as follows: "Extension tools are used when practical **to minimize dose when personnel are working on radioactive components/equipment**."

E18. (12.5.4.2) The second to last sentence of the third paragraph of the "Routine Maintenance" section should be changed as follows: "…accomplished as safely and quickly as possible, and what the acceptance criteria **for completing the job** are."

E19. (12.5.4.4) The second sentence of the third paragraph should be modified as follows: "…restricting access to each Very High radiation Area as required by 10 CFR 20.**1602.**"

E20. (12.5.4.7) Please change the second paragraph of this section as follows:

> "To the extent practical, procedures and engineered controls based on sound radiation protection principles are used to keep occupational doses and doses to members of the public as low as **is**

reasonably achievable (ALARA). A description of facility design features and engineered controls intended to maintain occupational exposures **ALARA** is included in **FSAR** Sections 12.3-12.4. A description of systems and facility design features intended to maintain public exposures ALARA is included in **FSAR** Chapter 11."

E21. (12.5.4.7) Please change the second sentence in the paragraph marked by the number 3 in the following way: "The briefing**s** are intended to assure that personnel understand…"

E22. (12.5.4.8) Please change the fourth and fifth bullets in this section in the following way: "Containments, caches and enclosures are used during maintenance, repairs, and testing**,** when practical**,** to contain spills and releases;" and "Engineering controls**,** such as portable ventilation or filtration units to reduce concentrations of radioactivity in air or fluids, are used where practical;…"

E23. (12.5.4.8) Please change the seventh bullet in this section to read as follows: "…necessitate disposal as radioactive waste **is** minimized."

May 19, 2008

Mr. Russell J. Bell, Director
New Plant Licensing
Nuclear Generation Division
Nuclear Energy Institute
1776 I Street, NW, Suite 400
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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING NUCLEAR ENERGY INSTITUTE TOPICAL REPORT 07-03, GENERIC FINAL SAFETY ANALYSIS REPORT TEMPLATE GUIDANCE FOR RADIATION PROTECTION PROGRAM DESCRIPTION, REVISION 5 (PROJECT NO. 689; TAC MD5248)

Dear Mr. Bell:

By letter dated April 12, 2007, the Nuclear Energy Institute (NEI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review its proposed topical report, NEI 07-03, "Generic Final Safety Analysis Report Template Guidance for Radiation Protection Program Description," Revision 0. Since this initial submittal, the document has undergone five subsequent revisions. Revision 5 was submitted to the NRC on March 25, 2008. The staff has reviewed the latest revision and determined that additional information is necessary to complete its review. An electronic copy of the enclosed request for additional information (RAI) was transmitted to Ralph Andersen of NEI. Although this RAI has already been provided to you electronically, we will not expect a response until 30 days following the date of issuance of this letter; therefore, please let me know if you will not be able to provide your written reply within that time period.

If you have any questions or comments regarding this matter, please contact Ms. Sheryl A. Burrows by telephone at (301) 415-6086 or by e-mail at Sheryl.Burrows@nrc.gov.

Sincerely,

/RA/

William D. Reckley, Chief
Rulemaking, Guidance and
Advanced Reactor Branch
Division of New Reactor Licensing
Office of New Reactors

Project No. 689

Enclosure:
As stated

cc: See next page

May 19, 2008

Mr. Russell J. Bell, Director
New Plant Licensing
Nuclear Generation Division
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

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As stated

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ADAMS ACCESSION NO.: ML081400205

OFFICE	PM:DNRL/NRGA	LA:DNRL/DNRL	BC:DCIP/CHPB	BC:DNRL/NRGA
NAME	SBurrows	RRobinson	TFrye	WReckley
DATE	05/19/08	05/19/08	05/19/08	05/19/08

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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING NUCLEAR ENERGY INSTITUTE TOPICAL REPORT 07-03, GENERIC FINAL SAFETY ANALYSIS REPORT TEMPLATE GUIDANCE FOR RADIATION PROTECTION PROGRAM DESCRIPTION, REVISION 5 (PROJECT NO. 689; TAC MD5248)

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Requests for Additional Information for Nuclear Energy Institute Template 07-03,
Revision 5, "Generic Final Safety Analysis Report Template
Guidance for Radiation Protection Program Description"

1. The inclusion of a bracketed "Note" in the template means that a combined license (COL) applicant referencing the template must include supplemental information in the final safety analysis report (FSAR) to address the information described in the bracketed Note. The use of the bracketed "Note" in Section 12.5.2.4 (page 6) does not meet this criterion for requesting additional information (RAI).

   Suggested fix: Remove the word "Note" in Section 12.5.2.4 (page 6) and reword the sentence in brackets to state that the COL applicants may modify the list of radiation protection technician responsibilities listed in the template based on company and site-specific information.

2. In Section 12.5.3.1, "Facilities" (page 8), the section describing the laboratory/counting room facility and instrumentation (part of the Radiochemistry Laboratory) implies that the guidance in NUREG-0737, Item II.B.3 applies to the area where post-accident samples are to be counted and analyzed (i.e., the laboratory/counting room facility). NUREG-0737, Item II.B.3 applies only to the sampling line system areas where the post-accident samples are to be drawn from.

   Suggested fix: Modify the wording in Section 12.5.3.1 (page 8) to state that NUREG-0737, Item II.B.3 applies only to the sampling line system areas where the post-accident samples are to be drawn from.

3. The use of the bracketed "Note" in Section 12.5.3.3 (page 12) does not meet the criteria for RAI described in RAI #1 above.

   Suggested fix: Remove the word "Note" in Section 12.5.3.3 (page 12) and replace the word "applicant" with "COL applicants".

4. In response to an earlier staff comment (submitted to Nuclear Energy Institute (NEI) as comment number 6 on February 11, 2008), NEI modified the information under the heading "Refueling" (Section 12.5.4.2, "Methods to Maintain Exposures as Low as Reasonably Achievable (ALARA)") so that the heading referred to all reactor types instead of only boiling-water reactors. The revised wording is unclear and deleted some of the information contained in the original text.

   Suggested fix: Replace the second and third sentences under the heading "Refueling" in Section 12.5.4.2 (page 15) to read, "Prior to and during refueling, the refueling pool water is continually purified in order to maintain exposures from activity in the water ALARA. During refueling operations, irradiated fuel assemblies are maintained underwater at all times."

Enclosure

Editorial RAIs:

1. (Page 12, Section 12.5.3.2), in the last bullet under the heading “Portable Monitoring Instrumentation and Equipment,” the sentence should have a single period instead of two.
2. (Page 15, Section 12.5.4.2), add a period at the end of the fourth sentence (after the word “progress”) under the heading “Refueling.”
3. (Page 19, Section 12.5.4.4), eliminate the large space gap on page 18 by relocating Section 12.5.4.4 to page 18.
4. (Page 19, Section 12.5.4.4), add a period after the word “escort” in the 4th line from the bottom of page 19 and begin the following sentence with “The designated…”
5. The References section of Revision 5 (page 27) has the incorrect title for Revision 4 of Regulatory Guide 1.97. The correct title is “Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants.”

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