

**NEI 08-08A [Revision 0]**

**Generic FSAR Template  
Guidance for Life Cycle  
Minimization of  
Contamination**

**October 2009**



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**Nuclear Energy Institute**

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## **ACKNOWLEDGEMENTS**

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## **EXECUTIVE SUMMARY**

NEI 08-08A, Revision 0, *Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination*, provides a complete generic program description for use in developing construction and operating license (COL) applications. The document reflects contemporary U.S. Nuclear Regulatory Commission (NRC) guidance, including Regulatory Guide 1.206, “Combined License Applications for Nuclear Power Plants,” and industry-NRC discussions regarding the applicable standard review plan section. In addition, the generic program description in this document will meet the requirements of 10 CFR 20.1406 for life-cycle minimization of contamination, in part, by addressing the applicable regulatory position elements of Regulatory Guide 4.21, “Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning.” A main objective of this program description is to assist in expediting NRC review and issuance of the combined license.

The industry guidance was endorsed by an NRC Final Safety Evaluation Report (SER) dated October 19, 2009, which is provided as Appendix B. Appendix C also provides NRC Requests for Additional Information.



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# **GENERIC FSAR TEMPLATE GUIDANCE FOR LIFE-CYCLE MINIMIZATION OF CONTAMINATION**

## **1 INTRODUCTION**

The nuclear power industry has long recognized the benefits and value of implementing sound radiation protection principles to achieve occupational and public doses that are as low as reasonably achievable (ALARA) and to minimize contamination and radioactive waste generation. The implementation of procedures, engineering controls, lessons learned and financial assurance requirements for decommissioning have been evident in the nuclear industry's efforts to minimize contamination and the generation of radioactive waste. In addition, under the Industry Ground Water Protection Initiative (GPI), nuclear power plants developed and implement a site-specific/company ground water protection program to assure timely and effective management of situations involving inadvertent or unintentional releases of licensed material to ground water. The GPI guidance was amended to include lessons learned and was published as "Industry Ground Water Protection Initiative – Final Guidance Document" (Reference 3). "Groundwater Protection Guidelines for Nuclear Power Plants," EPRI Report 1016099, dated January 2008 (Reference 4) provides one acceptable approach for an effective ground water protection program and provides a technical basis for this template.

The new reactors' general design consideration for the ALARA principles results in plants that minimize contamination and the generation of radioactive waste. Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be ALARA," recognizes that contaminated air and liquids present the potential for intake by inhalation and absorption and that contaminated surfaces present the potential for intake by ingestion. The basic variables identified that can be controlled to limit dose from internal exposure include those that limit: (1) the amount of contamination and (2) the dispersal of the contamination. Therefore, the ALARA principles include elements of a contaminant management philosophy that are part of the nuclear industry's total life cycle consideration for a facility. In implementing these ALARA principles, all reasonable engineered measures and operational practices should be considered in achieving the objectives identified in the template; however, cost alone should not be the only factor used in determining whether such measures are implemented.

This template implements Regulatory Guide 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning" (Reference 5) Regulatory Position for Combined License (COL) applicant's operational program. A COL applicant's program that is consistent with NEI 08-08A meets the requirements of 10 CFR 20.1406.

Each licensee's risk informed approach toward limiting leakage and/or controlling the spread of contamination is integrated in the design of the type facility selected and supplemented by the operating programs, processes and procedures. This template describes the content of operating programs/processes that will demonstrate compliance with 10 CFR 20.1406. Where specific site information is needed, that information is contained in double parentheses (( )) and will be provided by the applicant as specified in FSAR Section 13.4 prior to initial fuel load. A Note is provided for additional information or clarification of a section.

## 2 APPLICABILITY AND CONTROLS

This template applies to applicants for licenses whose applications are submitted after August 20, 1997 and provides an acceptable format and information for an operational program that may be used by a Combined License (COL) applicant to meet 10 CFR 20.1406.

This template applies to the applicant that has selected a Standard Design, as defined by 10 CFR Part 52, with design features and COL described design features, that when supplemented with operating programs, processes, and procedures as needed, are adequate to comply with 10 CFR 20.1406. The operating programs, processes and/or procedures identified within this template supplement those adequate design features to provide reasonable assurance that ‘spills, leaks, and inadvertent or unintentional discharges of radioactive effluents will be prevented or minimized.’

The operational, programmatic, and inspection/surveillance elements of Regulatory Guide 4.21 Regulatory Positions are addressed in this template. The controls identified within are based on specified plant programs that should be incorporated into those programs as necessary. The site program that addresses ground water monitoring should also address the identification of inadvertent or unintentional contamination of subsurface or native soil. The technical basis for the program for early detection of leakage for new reactor applications is the Industry Ground Water Protection Initiative-Final Guidance Document NEI 07-07 Section 1.0 Ground Water Protection Program. EPRI TR-1016099 provides a detailed technical basis in the accomplishment of NEI 07-07 and NEI 08-08A, and should be used to implement a comprehensive approach to the operational aspects of groundwater protection for new reactors. The applicant should develop the appropriate site procedures and/or programs to meet the GPI and implement these procedures and programs consistent with applicant’s FSAR section 13.4 (Radiation Protection Milestone 3 initial fuel load). The applicant's program involves an initial and periodic evaluation of the facility SSCs, work activities, and generic issues. The frequency of the evaluation should reflect factors that affect the likelihood and potential consequences from an inadvertent or unintentional loss of radioactive material to the environment.

**Note:** Section 2 of NEI 07-07 provides guidance on voluntary communication that is not part of the guidance provided in NEI 08-08A.

NEI 08-08A identifies the base operational program to supplement the standard designs. A COL applicant may identify site-specific programs/controls that depart from or enhance the items within NEI 08-08A based on a site-specific evaluation of the design features of the systems, structures, or components including any additional design information provided by the licensee in the COLA.

This template recognizes that other site programs, such as the maintenance and surveillance program, and radiation protection program, help to minimize contamination of the facility and the environment. The radiation protection program addresses the handling of radioactive materials including the control of contamination inside indoor structures or facilities and the movement of radioactive materials from one part of the site to another.

### **3 MINIMIZING FACILITY CONTAMINATION**

#### **3.1. MINIMIZATION OF LEAKS AND SPILLS AND PROVISION OF CONTAINMENT**

3.1.1 The facility incorporates design features that ensure, to the extent practicable, the integrity of systems, structures, and components (SSCs) to minimize leaks and spills, contain leaks/spills where they might occur, and include detection where industry experience indicates potential for leakage.

**Note:** Provide a listing of the section (s) of the Design Control Document (DCD) and/or Combined Operating License Application (COL) that describe, to the extent practicable, how the facility design minimizes contamination of the facility and the environment, facilitates eventual decommissioning, and minimizes the generation of radioactive waste. This information should consider, as a minimum, the items identified in Appendix A of this document. ((Complete appropriate items in Appendix A))

3.1.2 The facility layout will include designated areas for maintenance of equipment, decontamination of equipment/tools, and the storage of radioactive material. Clean areas will be segregated from contaminated areas.

3.1.3 Radiologically significant leaks and spills are evaluated and contained to ensure compliance with 10 CFR Part 20 and to minimize contamination to the extent practicable and cost effective. (Reference 10)

3.1.4 The applicant will evaluate all SSCs that contain or could contain licensed material and for which there is a credible mechanism for the licensed material to reach ground water consistent with Reference 3 and Reference 4 and will:

**Note:** A "credible mechanism" for the licensed material to reach ground water is considered one wherein the failure of a single barrier between the SSC and the environment that could result in inadvertent or unintentional contamination of ground water or native soil.

**Note:** "reasonably expected" takes into account the maintenance history, condition, or age of the SSC as determined during the evaluation of the SSC described in this step and could result in an uncontrolled release to the environment by some means other than an ODCM-credited release point.

- a. Identify each SSC that involves or could reasonably be expected to involve licensed material and for which there is a credible mechanism for the licensed material to reach ground water. Examples of SSCs of interest include: refueling water storage tanks, if outdoors; spent fuel pools; spent fuel pool leak detection systems; outdoor tanks; outdoor storage of contaminated equipment; buried piping; retention ponds or basins or reservoirs; and lines carrying steam.

**Note:** For additional examples of systems that could become contaminated see

IE Bulletin No. 80-10, Contamination of Non-Radioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment, (Reference 6).

- b. Identify existing leak detection methods for each SSC that involve or could involve licensed material and for which there is a credible potential for inadvertent releases to ground water. These may include ground water monitoring, operator rounds, engineering walk downs or inspections, leak-detection systems, or periodic integrity testing.
- c. Identify potential enhancements to leak detection systems or programs. These may include additional or increased frequency of rounds or walk downs or inspections, or integrity testing.
- d. Identify potential enhancements to prevent spills or leaks from reaching ground water. These may include resealing or paving surfaces or installing spill containment measures.
- e. Identify the mechanism or site process for tracking corrective actions.
- f. Establish long term programs to perform preventative maintenance or surveillance activities to minimize the potential for inadvertent releases of licensed materials due to equipment failure.
- g. Establish the frequency for periodic reviews of SSCs.

**Note:** Licensee should provide justification for the selected period for reviewing SSCs.

3.1.5 The minimization of leaks and spills from operational practices is discussed in section 3.5.

3.1.6 Site procedures and programs will include measures to control contamination resulting from leaks or spills of licensed material to surface water from SSCs or work practices in accordance with the ALARA principles described in Regulatory Guide 8.8 (Reference 2).

((Identify and describe site procedure and/or report that documents performance of section 3.1))

## 3.2. PROMPT DETECTION OF LEAKAGE

**Note:** A "credible mechanism" for the licensed material to reach ground water is considered one wherein failure of a single barrier between the SSC and the environment could result in inadvertent or unintentional contamination of ground water or native soil.

- 3.2.1 The site procedures and programs will include monitoring and routine surveillance of accessible systems with the potential for leakage and for which there is a credible mechanism for the licensed material to reach ground water. The objective is to enable early detection of contamination and to provide a timely assessment and responses based on the location and characteristics of the leak or spill consistent with Reference 3 and Reference 4.
- 3.2.2 The applicant will establish an on-site ground water monitoring program to ensure timely detection of inadvertent radiological releases to ground water and will:
- a. Using the hydrology and geology studies developed under 4.1 below, consider placement of ground water monitoring wells downgradient from the plant but within the boundary defined by the site license. (i.e. the boundary defined for compliance with 10 CFR Part 20).
  - b. Consider, as appropriate, placing sentinel wells closer to SSCs that have the highest potential for inadvertent releases that could reach ground water or SSCs where leak detection capability is limited.
  - c. Establish sampling and analysis protocols and frequencies, including analytical sensitivity requirements, for ground water and soil. Sampling for tritium in the vadose or unsaturated zone may not be practicable and may require additional evaluation. For split or duplicate samples, analytical sensitivity levels should be discussed with and agreed to by those external stakeholders responsible for the analyses to preclude future disputes.

**Note:** Analytical sensitivity levels are typically the Lower Limits of Detection (LLD)/Minimum Detectable Activity (MDA) and external stakeholder's (State & local authorities) LLDs or MDAs will vary from site to site.

- d. Establish a formal, written program for long-term ground water monitoring. For those ground water monitoring locations that are included in the REMP, include them in the site's ODCM/ODAM.
- e. Periodically review existing station or contract lab(s) analytical capabilities. An important consideration is the time needed to obtain results.
- f. Establish a long-term program for preventative maintenance of ground water wells.
- g. Establish the frequency for periodic review of the ground water monitoring program.

((Identify and describe site procedure and/or program that documents performance of section 3.2))

### **3.3. MINIMIZE THE POTENTIAL OF THE RELEASE OF CONTAMINATION FROM UNDETECTED LEAKS**

- 3.3.1 The leak detection program objective is to identify leaks that may be hard to identify due to accessibility or the size of the leak and that, over an extended period

of time, could result in accumulation of subsurface residual contamination. Examples of SSCs of interest include: buried pipes with radioactive liquids, tanks/pools embedded in concrete, or tanks in contact with soil; all of which are susceptible to undetected leakage (Reference 5).

- 3.3.2 The use of remote monitoring techniques, e.g. cameras, should be considered for SSCs that are potential sources of leaks and are located in areas that are not readily accessible or that are not frequently accessed.

((Identify and describe site procedure and/or program that documents performance of the above section 3.3))

### **3.4. REDUCING THE NEED FOR DECONTAMINATION OF EQUIPMENT AND STRUCTURES**

- 3.4.1 The facility design for components containing radioactive liquids considers the selection of materials; minimization of buried components; improved protection of buried components. Site procedures should incorporate the use of industry consensus codes and standards for repair and/or replacement of components; periodic inspection or testing; and quality control and quality assurance in the procurement specifications and during installation of components based on their potential for leakage.

- 3.4.2 The facility ventilation design for areas containing radioactive contamination includes provisions for ensuring that air flow moves from the areas of no or minor contamination to areas with greater contamination. The site radiation protection program includes routine airborne sampling of general areas that would identify radioactive contamination resulting from ventilation problems.

- 3.4.3 The site procedures for the operational ALARA program should decrease the probability of a release, the amount released, and the spread of a contaminant by including, when appropriate, temporary or supplemental ventilation systems; by treating the exhaust from vents and overflows, and by using techniques to control releases of radioactive liquids and steam.

((Identify and describe site procedure and/or program that documents performance of section 3.4))

### **3.5. REVIEW OF OPERATIONAL PRACTICES**

- 3.5.1 The applicant will evaluate work practices that involve licensed material and for which there is a credible mechanism for the licensed material to reach ground water consistent with Reference 3 and Reference 4 and will:

**Note:** a "credible mechanism" for the licensed material to reach ground water" is considered one wherein the failure of a single barrier between the work practice and

the environment that could result in inadvertent or unintentional contamination of ground water or native soil.

**Note:** "Reasonably expected" takes into account the condition or age of equipment used in the work practice or its operational history as determined during the evaluation of the work practice described in this step and could result in an uncontrolled release to the environment by some means other than an ODCM-credited release point.

- a. Identify each work practice that involves or could reasonably be expected to involve licensed material and for which there is a credible mechanism for the licensed material to reach ground water. Examples of work practices that should be evaluated may be found in Reference 4.
- b. Identify existing leak detection methods for each work practice that involves or could involve licensed material and for which there is a credible potential for inadvertent releases to ground water. These may include ground water monitoring, operator rounds, engineering walk downs or inspections, leak-detection systems, or periodic integrity testing.
- c. Identify potential enhancements to leak detection systems or programs. These may include additional or increased frequency of rounds or walk downs or inspections, or integrity testing.
- d. Identify potential enhancements to prevent spills or leaks from reaching ground water. These may include resealing or paving surfaces or installing spill containment measures.
- e. Identify the mechanism or site process for tracking corrective actions.
- f. Establish long term programs to perform preventative maintenance or surveillance activities to minimize the potential for inadvertent releases of licensed materials due to equipment failure.
- g. Establish the frequency for periodic reviews of work practices.

((Identify and describe site procedure and/or program that documents performance of the above section 3.5.1))

3.5.2 Events that result in leaks and spills of radioactive materials should be analyzed and evaluated based on the significance of the event (See Reference 5 page 6 footnote 1). The analysis should:

- a. Determine the apparent or root cause that contributed to the event,
- b. Evaluate the extent of condition/applicability to similar related facility operations and,
- c. Identify immediate and interim corrective actions as required by the site corrective action program.

((Identify and describe site procedure/and or program that documents performance o the above section 3.5.2))

## **4 GUIDES FOR MINIMIZING CONTAMINATION OF THE ENVIRONMENT**

### **4.1. SITE CONCEPTUAL MODEL DEVELOPMENT**

**NOTE:** As used in NEI 08-08, the term “site conceptual model” is used interchangeably with “conceptual site model” or “conceptual model”.

4.1.1 The applicant will ensure that the site characterization of geology and hydrology provides an evaluation of predominant ground water flow characteristics based upon current site conditions consistent with Reference 3 and Reference 4 and will:

**Note:** FSAR Section 2 Hydrologic Engineering contains the data for site characterization.

- a. Perform hydrogeologic and geologic studies to determine predominant ground water flow characteristics and gradients.
- b. As appropriate, review existing hydrogeologic and geologic studies, historical environmental studies, and permit or license related reports.
- c. Identify potential pathways for ground water migration from on-site locations to off-site locations through ground water.
- d. Establish the frequency for periodic reviews of site hydrogeologic studies. As a minimum, reviews should be performed whenever any of the following occurs.
  - i Substantial on-site construction,
  - ii Substantial disturbance of site property,
  - iii Substantial changes in on-site or nearby off-site use of water, or
  - iv Substantial changes in on-site or nearby off-site pumping rates of ground water.

**Note:** Substantial changes to the hydrological conditions are site specific and should be evaluated by the applicant’s professional geologist/hydrologist.

- e. As appropriate, update the site’s Final Safety Analysis Report with changes to the characterization of hydrology and/or geology.

- 4.1.2 The applicant's site characterization, facility design, construction, potential release mechanisms, release pathways and location of contaminant provides an evaluation of the interface between environmental systems and the features that will control movement of contamination in the environment.

((Identify and describe site procedure and/or program that documents performance of section 4.1))

## **4.2 EARLY DETECTION OF LEAKAGE AND CONTAMINANT MIGRATION**

- 4.2.1 The site ground water monitoring systems should be deployed to support the early detection of leakage and contaminant migration. These systems will be placed, based on the potential flow paths, in optimum locations relative to SSCs that contain radioactive liquids and that are either buried or are in contact with the ground.

- 4.2.2 The site procedures for the ground water monitoring program should include a program for periodic sampling of ground water close to the potential source to verify the integrity of the system.

((Identify and describe site procedure and/or program that documents performance of section 4.2))

## **4.3. FINAL SITE CONFIGURATION**

**Note:** Consistent with NEI 07-07, the applicant will develop the appropriate site procedures and/or programs to meet the GPI and implement them consistent with FSAR section 13.4 prior to initial fuel load.

- 4.3.1 The site conceptual model should be updated with the final "as-built" site configuration following construction.
- 4.3.2 The site characterization of geology and hydrology should be reviewed to ensure that it provides an understanding of predominant ground water flow characteristics based upon this final site configuration.
- 4.3.3 The on-site ground water monitoring program should be reviewed to ensure that it provides timely detection of inadvertent radiological releases to ground water that reflect the final site configuration.
- 4.3.4 The site protocol for responding to the detection of leaks and spills should be reviewed to ensure that it reflects the final site configuration and facility design.

((Identify and describe site procedure and/or program that documents performance of the above section 4.3))

## **5. FACILITATION OF DECOMMISSIONING**

### **5.1. DESIGN AND OPERATIONAL FEATURES THAT FACILITATE DECOMMISSIONING**

5.1.1 The means for facilitating decommissioning begins at the design stage and should be incorporated into the procedures and operations. The objective is to ensure that throughout the life of the facility, the plant design and the operating procedures minimize the amounts of residual radioactivity that will require remediation at the time of decommissioning.

5.1.2 The applicant will establish a remediation protocol to prevent migration of licensed material off-site and to minimize decommissioning impacts that are consistent with Reference 3 and Reference 4 and will:

- a. Establish written procedures outlining the decision making process for remediation of leaks and spills or other instances of inadvertent releases. This process is site specific and shall consider migration pathways.
- b. Evaluate the potential for detectible levels of licensed material resulting from planned releases of liquids and/or airborne materials.

**Note:** Applicants should use the first 5 years of effluent release data to perform the evaluation in section 5.1.2.b. This time frame allows the licensee to obtain statistically valid data sets for radioactive effluent releases and for on-site ground water monitoring samples over time, while the plant completes at least one refueling outage. Licensees will perform on-site ground water monitoring throughout the plant's operation, beginning at initial fuel load.

- c. Evaluate and document, as appropriate, decommissioning impacts resulting from remediation activities or the absence thereof.

((Identify and describe site procedure (s) that will implement section 5.1.2))

### **5.2 DECOMMISSIONING RECORDS**

5.2.1 Records of instances of facility and environmental contamination and operational events that are of interest for decommissioning or that result in residual contamination will be documented over the lifetime of the plant.

5.2.2 The applicant will ensure that records of leaks, spills, and remediation efforts are retained and retrievable to meet the requirements of 10 CFR 50.75(g) and 10 CFR 72.30 (d).

- 5.2.3 The above documented events will assist in developing a historical assessment of the site and facility, thereby reducing the time, effort, and potential hazard to personnel during decommissioning activities. These records should also be used to determine an area's classification for purposes of performing surveys during decommissioning. (See NRC Regulatory Issue Summary 2002-02 Lessons Learned Related to Recently Submitted Decommissioning Plans and License Termination Plans). (Reference 9).

## **6 MINIMIZING THE GENERATION OF WASTE**

### **6.1 WASTE MANAGEMENT**

- 6.1.1 The approach used to identify significant radioactive components (for example replacement of steam generator(s), reactor head, pressurizer, reactor coolant pump(s)) used in the facility and the waste that will result from operations and processing should be documented in a life-cycle waste management plan.
- 6.1.2 The waste management program should consider options to implement measures that minimize waste generation and radioactivity levels over the life cycle of the facility, including decommissioning.

((Identify and describe site procedure and/or program that documents performance of the above section 6.1))

### **6.2 ONSITE STORAGE OF RADIOACTIVE WASTE**

- 6.2.1 The waste management program should include additional onsite storage when other disposal or treatment options are not available. Provisions for the decontamination and decommissioning of the storage facility should be considered.
- 6.2.2 Periodic assessments of the waste stored onsite should also be performed using the guidance provided in Reference 7 and 8.

((Identify and describe site procedure and/or program that documents performance of the above section))

## **7. DEFINITIONS**

*Radiologically Significant:* The "significance" threshold is the unexpected radiological conditions resulting from spills, leaks, unplanned releases or the identification of radioactive materials in unexpected locations that could have an adverse impact on license termination under Subpart E of 10 CFR Part 20 (Reference 10).

*Ground water* as used in this document, means any subsurface water, whether in the unsaturated or vadose zone, or in the saturated zone of the earth.

*Leak or Spill:* The terms “leak” or “spill” refers to an inadvertent event or perturbation in a system or component’s performance that results in contamination escaping from its intended confinement or container.

*Licensed material* (from 10 CFR 20.1003) means source material, special nuclear material, or byproduct material received, possessed, used, transferred or disposed of under a general or specific license issued by the Commission.

## **8. REFERENCES**

1. 10 CFR Part 20.1406 “Minimization of Contamination.”
2. Regulatory Guide 8.8, Information Relevant To Ensuring That Occupational Radiation Exposures At Nuclear Power Stations Will Be As Low As Is Reasonably Achievable.
3. NEI 07-07 “Industry Ground Water Protection Initiative – Final Guidance Document,” August 2007.
4. EPRI –TR-1016099, Groundwater Protection Guidelines for Nuclear Power Plants, January 2008 (Public Edition).
5. Regulatory Guide 4.21, Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning.
6. IE Bulletin No. 80-10, Contamination of Nonradioactive System and Resulting Potential For Unmonitored, Uncontrolled Release of Radioactivity to Environment.
7. NRC Regulatory Issue Summary 2008-32 Interim Low Level Radioactive Waste Storage at Reactor Sites. December 30, 2008.
8. EPRI Report # 1018644, February 2009 – “Guidelines for Operating an Interim On Site Low Level Radioactive Waste Storage Facility – Revision 1.”
9. NRC Regulatory Issue Summary 2002-02, Lessons Learned Related to Recently Submitted Decommissioning Plans and License Termination Plans.
10. ACRS July 22, 2009 Letter “Draft Template NEI 08-08, Generic FSAR Template Guidance For Life Cycle Minimization Of Contamination,” and Draft DC/COL-Interim Staff Guidance-06” (ML092010544).

**APPENDIX A**

<b>FACILITY DESIGN, OPERATIONAL, AND PROCEDURAL IMPLEMENTATION OF 10 CFR 20.1406</b>	
<b>Design Items</b>	<b>((DCD/FSAR REFERENCE))</b>
Minimize leaks and spills and provide containment in areas where such events may occur,	
Provide for adequate leak detection capability to provide prompt detection of leakage for any structure, system, or component which has the potential for leakage,	
Use leak detection instrumentation capable of detecting leaks in areas where it is difficult or impossible to conduct regular inspections (such as for spent fuel pools, tanks that are in contact with the ground, and buried, embedded, or subterranean piping) to avoid release of contamination from undetected leaks,	
Reduce the need to decontaminate equipment and structures by decreasing the probability of any release, reducing any amounts released, and decreasing the spread of the contaminant from the source,	
Provide for early detection of leakage and contamination migration to minimize contamination of the environment,	
Facilitate decommissioning by minimizing embedded and buried piping,	

<b>FACILITY DESIGN, OPERATIONAL, AND PROCEDURAL IMPLEMENTATION OF 10 CFR 20.1406</b>	
<b>Design Items</b>	<b>((DCD/FSAR REFERENCE))</b>
Facilitate decommissioning by designing the facility to facilitate the removal of any equipment and/or components that may require removal and/or replacement during facility operation or decommissioning,	
Minimize the generation and volume of radioactive waste both during operation and during decommissioning (by minimizing the volume of components and structures that become contaminated during plant operation)	
Detect leakage from the piping in any radwaste trenches.	
Verify that there are no piping runs containing contaminated fluids that will be buried in the ground and not routed through one of the radwaste trenches.	
Isolate areas containing radioactive components and materials from areas containing non-radioactive components and minimize interfaces between them	
Use designs and materials that facilitate maintenance, decontamination and eventual disposal	
To the extent practical, ensure that SSC containing radioactive materials are separated from the environment by at least two impermeable barriers	

<b>FACILITY DESIGN, OPERATIONAL, AND PROCEDURAL IMPLEMENTATION OF 10 CFR 20.1406</b>	
<b>Operational and Procedural Items</b>	<b>((SITE PROCEDURE/PROGRAM))</b>
Periodically review operational practices to ensure that, operating procedures are revised to reflect the installation of new or modified equipment, personnel qualification and training are kept current, and facility personnel are following the operating procedures,	
Facilitate decommissioning by maintenance of records relating to facility design and construction, facility design changes, changes to the facility during operation, site conditions before and after construction, onsite waste disposal and contamination and results of radiological surveys,	
Develop a site conceptual model (based on site characterization and facility design and construction) which will aid in the understanding of the interface with environmental systems and the features that will control the movement of contamination in the environment,	
Evaluate the final site configuration after construction to assist in preventing the migration of radionuclides offsite via unmonitored pathways,	
Describe the criteria that govern the frequency of performing periodic visual inspections of areas such as; the piping in the radwaste pipe trenches to check for leaks, the floor/wall expansion joints in the radwaste pipe trenches, accessible building seams, to ensure that no spills or leaks enter unmonitored areas beneath the floors and foundations. The use of remote monitoring is considered for areas that are not readily accessible or frequently accessed.	



## **APPENDIX B – NRC FINAL SAFETY EVALUATION REPORT**



October 19, 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 08-08, GENERIC FINAL SAFETY ANALYSIS  
REPORT TEMPLATE GUIDANCE FOR LIFE-CYCLE MINIMIZATION  
OF CONTAMINATION, REVISION 3 (PROJECT NO. 689)

Dear Mr. Bell:

By letter dated August 10, 2007, the Nuclear Energy Institute (NEI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review its proposed technical report, NEI 08-08, "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination," Revision 0. The template has undergone three subsequent revisions. NEI submitted Revision 3 of the NEI 08-08 Template by letter dated September 9, 2009.

Enclosed is the NRC staff's safety evaluation (SE) which defines the basis for acceptance of NEI 08-08, Revision 3. The NRC staff finds that for combined license (COL) applications, NEI 08-08, Revision 3, provides an acceptable template for an operational program to minimize contamination throughout the life-cycle of a facility which meets applicable NRC regulations and guidance.

Our acceptance applies only to material provided in NEI 08-08, Revision 3. We do not intend to repeat our review of the acceptable material described in the NEI 08-08, Revision 3. When NEI 08-08, Revision 3 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 08-08, Revision 3, 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 08-08, Revision 3 as NEI 08-08A, Revision 0 within 3 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.

R. Bell

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If future changes to the NRC's regulatory requirements affect the acceptability of NEI 08-08, Revision 3, NEI will be expected to revise NEI 08-08 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](mailto: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

R. Bell

-2-

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SAFETY EVALUATION  
REGARDING THE NUCLEAR ENERGY INSTITUTE  
TECHNICAL REPORT 08-08  
“GENERIC FINAL SAFETY ANALYSIS REPORT TEMPLATE GUIDANCE  
FOR LIFE-CYCLE MINIMIZATION OF CONTAMINATION”  
REVISION 3

1.0 BACKGROUND

By letter dated September 9, 2009, the Nuclear Energy Institute (NEI) submitted a technical report, NEI 08-08, “Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination,” Revision 3 [Reference 5.1], for U.S. Nuclear Regulatory Commission (NRC) staff review. NEI initiated this program as a generic template, under NEI Project No. 689, in a letter dated August 10, 2007 [Reference 5.2]. The NEI template was developed by NEI to assist NRC review and approval of a combined license (COL) submitted by applicants. Combined license means a combined construction permit and operating license with conditions for a nuclear power facility issued under 10 CFR Part 52 Subpart C. Following a series of public meetings, communications, and letters, NEI addressed NRC comments and issued the third revision of the NEI 08-08 Template. The NEI 08-08 Template describes an operational program to minimize contamination throughout the life-cycle of a facility, including provisions for minimizing facility contamination, environmental contamination, waste generation, and facilitating decommissioning.

The generic Guidance for Life-Cycle Minimization of Contamination presented in the NEI 08-08 Template provides one acceptable method for a COL applicant to demonstrate compliance with NRC regulatory requirements, guidance, and acceptance criteria listed in:

- Title 10 of the *Code of Federal Regulations*, Section 20.1406 (10 CFR Section 20.1406), “Minimization of Contamination,” [Reference 5.3] of 10 CFR Part 20,
- Regulatory Guide (RG) 1.206 “Combined License Applications for Nuclear Power Plants (LWR Edition),” [Reference 5.4],
- RG 4.21, “Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning,” [Reference 5.5],
- NUREG-0800, Sections 11 and 12 of the “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants,” (SRP) [Reference 5.6].

The COL applicant is to provide the operational programs and procedures that address design features of the Standard Design, as defined by 10 CFR Part 52, as well as the COL applicant described design features. The NEI template identifies plant and site-specific information that a COL applicant will provide prior to fuel load. This information includes a description of site

procedures, programs and controls, related to various aspects of minimization of contamination. NEI 08-08 identifies the need for site-specific information by the use of double parentheses (()). As a result, the NEI 08-08 Template complies with applicable NRC regulations and the intent of the regulatory guidance provided and may be used for COL applications submitted under the requirements of Subpart C of Title 10 CFR Part 52. A site-specific operational life-cycle minimization of contamination program that is based on NEI Template 08-08 and implemented by COL applicants in accordance with the Radiation Protection Program's milestone 3 and license conditions described in COL Safety Analysis Report Section 13.4, constitutes an acceptable program for meeting the requirements of 10 CFR Section 20.1406.

## 2.0 REGULATORY EVALUATION

The NRC staff verified that NEI 08-08 complies with the following regulations, and is consistent with the intent of the guidance provided in the following regulatory guidance, NUREGs and industry standards.

The following listing identifies the major regulatory requirements:

- 10 CFR Part 20, "Standards for Protection against Radiation."
- 10 CFR Section 20.1406, "Minimization of Contamination."
- 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."
- 10 CFR Section 50.75, "Reporting and Recordkeeping for Decommissioning Planning."
- 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."
- 10 CFR Section 72.30, "Financial Assurance and Recordkeeping for Decommissioning."

The relevant requirements of the regulations identified above are met by meeting the intent of the following key RGs, NUREGs, regulatory information and industry standards:

- Inspection and Enforcement (IE) Bulletin 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release to Environment."
- RG 4.21, "Minimization of Contamination and Radioactive Waste Generation."
- RG 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be as Low as is Reasonably Achievable."
- NUREG-0800, Revision 3, SRP Section 12.3 -12.4, "Radiation Protection Design Features."
- Interim Staff Guidance (ISG) DC/COL-ISG-06, "Interim Staff Guidance on Evaluation and Acceptance Criteria for 10 CFR Section 20.1406 to Support Design Certification and Combined License Application," [Reference 5.10].

### 3.0 TECHNICAL EVALUATION

The NRC staff's review concentrated on the program description, format, attributes and level of detail. In evaluating the level of detail and content of the NEI 08-08 Template, the NRC staff followed the guidance of SRP Sections 11.2, 11.3, 11.4, 12.3, 12.4 and 12.5, as well as DC/COL-ISG-06 and RG 4.21. DC/COL-ISG-06 outlines the NRC position on what is an acceptable level of detail and content required for an applicant to demonstrate compliance with 10 CFR Section 20.1406. RG 4.21 presents guidance to develop a performance based program for minimization of contamination and radioactive waste generation through life-cycle planning for an acceptable method to demonstrate compliance with 10 CFR Section 20.1406.

Given the above regulatory requirements and guidance, the NRC staff's review focused on identifying the elements of the NEI 08-08 Template that address the programmatic elements of life-cycle planning for minimization of contamination and radioactive waste generation. The COL applicant's plant and site-specific operational program to minimize contamination will be developed and implemented consistent with Final Safety Analysis Report (FSAR) Section 13.4 of the COL application (Radiation Protection Milestone 3, initial fuel load).

#### 3.1 Operational Life-Cycle Minimization of Contamination Program Description Template Overview

NEI 08-08 provides guidance to develop a complete generic program description for compliance with operational aspects of minimizing contamination at a facility when developing COL applications. It will be incumbent on the COL applicant to provide site-specific information as described in NEI 08-08, and to implement a complete life-cycle minimization of contamination program. The purpose of the program is to address minimization of leaks and spills, prompt leak detection, avoid migration of contamination from undetected leaks, reduce decontamination of equipment and structures, update final site conceptual model, facilitate decommissioning, and waste management. The template would apply to the COL applicant that has selected a Standard Design, as defined by 10 CFR Part 52, and would address standard design features and COL described design features, that when supplemented by operational programs, are adequate to comply with 10 CFR Section 20.1406 requirements. Consistent with SECY 05-0197, the implementation of the minimization of contamination program identified in NEI Template 08-08, does not necessitate inspection, test, analysis, and acceptance criteria in a design certification or COL application, if the program is fully described. One of the purposes of this template is to present a program that is clearly and sufficiently described in terms of the scope and level of detail to allow a reasonable assurance finding of acceptability

##### 3.1.1 Template Organization

The NEI 08-08 Template is organized into 8 sections and 1 appendix. The first two sections provide the introduction, applicability and controls. The third section addresses minimization of facility contamination; including elements to minimize leaks and spills, detect leaks quickly, avoid release of contamination from undetected leaks, reduce the need for decontamination of equipment and structures, and conduct periodic review of operational practices. This section has a placeholder for references to sections of the design certification document (DCD) and COL applications to describe how the facility design supports the site's operational program. The NEI 08-08 Template appendix lists design features that should be included. The fourth

section addresses guides for minimizing contamination of the environment. This section includes conceptual site model development, early detection of leakage and contaminant migration, and final site configuration. The fifth section describes the elements to facilitate decommissioning, including design and operational features to support decommissioning and decommissioning records. The sixth section describes the element to minimize the generation of waste by waste management and additional controls for onsite storage of radioactive waste. Sections 7 and 8 include definitions and references for the template.

### 3.1.2 Site Specific Information

Where specific site information is needed to fully describe the programs and processes for minimizing contamination, that information is contained in double parentheses (( )) and will be provided by the applicant as specified in FSAR Section 13.4 prior to initial fuel load.

### 3.1.3 Summary

In summary, the identified site-specific information includes a description of procedures, reports and/or programs for:

- minimization of leaks and spills,
- prompt leak detection,
- avoidance of release of contamination from undetected leaks,
- reduction of the need for decontamination,
- evaluation of work practices involving licensed material,
- development and implementation of conceptual site model,
- decommissioning facilitation and recordkeeping,
- waste management, and
- place holders to describe design features that support the minimization of contamination operational program.

## 3.2 NEI 08-08 Template Details

The NRC staff review and evaluation of the NEI 08-08 Template is organized into five functional areas;

- Introduction and Applicability,
- minimization of facility contamination,
- minimization of environmental contamination,
- facilitation of decommissioning, and
- minimization of radiological waste generation.

This approach is consistent with the review process identified in Section 12.3-12.4 of the SRP and DC/COL-ISG-06.

### 3.2.1 Introduction and Applicability of NEI 08-08 Template

NEI 08-08 Template Section 1 "Introduction", and 2 "Applicability and Controls" note that this template implements Regulatory Guide 4.21 for license applications submitted after

August 20, 1997, which reference a Standard Design. As stated in the NEI 08-08 Template, NEI 07-07, "The Industry Ground Water Protection Initiative-Final Guidance Document," Section 1.0, "Ground Water Protection Program" [Reference 5.8], is the basis of the program for early detection of leakage described. Consistent with NEI 07-07, the COL applicant will develop the appropriate site procedures and programs to meet the Ground Water Protection Initiative (GPI) requirements for a protocol for responding to the detection of leaks and spills. The NEI 08-08 Template notes that the communications provisions of NEI 07-07 Template Section 2, "Communication" are not part of the NEI 08-08 Template. However, the introduction to NEI Template 07-07 states that "Each member company constructing a new plant after year 2006 shall develop the appropriate site procedures and/or programs to meet the GPI and implement them prior to initial receipt of nuclear fuel." An effective method of communications with stakeholders is a key part of a GPI, and COL applicants are encouraged to include this in their operating programs. The NEI 08-08 Template addresses the programmatic elements of 10 CFR Section 20.1406, "Minimization of Contamination," while recognizing that other supporting site programs, such as the Radiation Protection and Maintenance and Surveillance programs will be developed under the requirements of license conditions.

The staff has reviewed the proposed NEI 08-08 and found that it is acceptable in describing the operational and programmatic elements and controls needed to be consistent with the guidance provided in RG 4.21, to meet the requirements of 10 CFR 20.1406.

### 3.2.2 Minimizing Facility Contamination

NEI 08-08 Template Section 3, "Minimizing Facility Contamination," addresses the development of operational programs and procedures to limit leakage and control the spread of contamination consistent with the intent of the guidance provided by RG 4.21. As stated in the NEI 08-08 Template, NEI 07-07 Template Section 1.0, "Ground Water Protection Program" [Reference 5.8], is the technical basis for the GPI. NEI 08-08 also notes that Electric Power Research Institute (EPRI) Report TR-1016099 [Reference 5.9] provides a detailed technical basis in the accomplishment of NEI 07-07 and NEI 08-08, and should be used to implement a comprehensive approach to the operational aspects of ground water protection for new reactors. It is the position of the NRC staff that deviations from the guidance provided in EPRI-TR-1016099 constitute an exception to the NEI 08-08 Template, and are to be identified as such during the application process. The NEI 08-08 Template also recognizes that IE Bulletin No. 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment" [Reference 5.14], provides additional information regarding system interactions that could result in facility contamination. The NRC staff review concluded that the scope and elements of the programmatic aspects of minimization of facility contamination identified in NEI Template 08-08 are consistent with the requirements identified in NRC regulations and the intent of the regulatory guidance.

The NEI 08-08 Template identifies activities and practices for minimizing leaks and spills, such as:

- Identification of worker practices regarding segregation of contaminated areas and access control,
- The use of risk based structure, system or component (SSC) evaluation as described in NEI 08-08 Section 3.1.4,

- The use of EPRI-TR-1016099 and NEI 07-07 as technical basis documents,
- The use of as low as reasonably achievable (ALARA) principals to control contamination resulting from spills or leaks,
- Evaluation and periodic review of worker practices involving licensed material for which there is a credible mechanism for the licensed material to reach ground water,
- Review of leak detection systems, and
- Establishment of long term preventative maintenance or surveillance activities

The NEI 08-08 Template notes that a 'credible mechanism' for the licensed material to reach ground water is considered to be one wherein the failure of a single barrier between the SSCs and the environment could result in inadvertent or unintentional contamination of ground water or native soil. NEI 08-08 Template uses EPRI Ground Water Protection Guidelines for Nuclear Power Plants and NEI 07-07 to identify leak detection methods for each SSC that has a credible mechanism for the licensed materials to reach ground water and describes the use of program elements to identify and implement potential enhancements to these programs as a result of periodic reviews. As already described, EPRI-TR-1016099 provides the detailed technical basis for the accomplishment of NEI 07-07, which is in turn, the basis for NEI Template 08-08. EPRI-TR-1016099 notes that a review of potential sources of subsurface contamination will be performed every 5 years. NEI 08-08 states that the COL applicant is to establish and document the basis for the frequency of this review. It is the position of the NRC staff that SSC review periods in excess of 5 years are a deviation from the guidance provided in EPRI-TR-1016099 and constitute an exception to the NEI 08-08 Template, and must be identified as such during the application process. Additionally, the template describes site procedures and programs for monitoring and routine surveillance of accessible systems, on-site ground water monitoring, ensuring adequate leakage detection capability, and the use of remote surveillance techniques for monitoring potential sources of leaks in not readily accessible or not frequently accessed areas. The template notes that the leak detection program objective is to identify leaks that may other wise be hard to identify due to accessibility or the size of the leak.

The NEI 08-08 Template Section 3.1.4(a) provides some examples of SSCs that could reasonably be expected to involve radioactive material and for which there is a credible mechanism for the material to reach the surrounding environment and ground water, one of which is a refueling water storage tank, if outdoors. NEI has indicated that the verbiage related to outdoor tanks was included to provide consistency with the examples listed in the NEI 07-07 Template. As noted by NEI, the intent of 3.1.4(a) is not to limit the review of refueling water storage tanks to only those located outdoors, rather the system evaluation should include both the provisions of 3.1.4(b) and 3.3.1, which addresses tanks or pools imbedded in concrete in contact with soil that are susceptible to undetected leakage.

The template addresses provisions for establishing processes and procedures to minimize facility contamination by:

- segregating facility contaminated areas and clean areas,
- addressing and containing radiological leaks and spills to the extent practicable in a cost effective manner,
- evaluating SSCs consistent with the industry ground water protection program and EPRI ground water protection guidelines,

- identifying the causes and corrective actions for events, and
- conducting periodic reviews of operational procedures.

The provisions for minimization of leaks and spills and provision of containment are in accordance with the intent of the guidance for operational programs found in Regulatory Position C 1.2 in RG 4.21.

The template includes provisions for the monitoring and routine surveillance of accessible systems and the use of remote monitoring techniques for SSCs that are not readily accessible or infrequently accessed. For hard to detect leaks, the template describes a leak detection program for systems that might accumulate subsurface residual activity. The template includes provisions to provide timely assessment and response in the event of leaks. These provisions are consistent with the guidance for operational programs found in Regulatory Positions C 1.3 and C 1.4 in RG 4.21.

The template includes provisions for reducing the need to decontaminate equipment and structures by incorporating the use of industry consensus codes and standards for repair or replacement of components, use of quality control and quality assurance in procurement specifications for components based on reducing the potential for leakage, and use of an operational ALARA program to minimize the spread of contamination. These provisions are consistent with the intent of the guidance for operational programs found in Regulatory Position C 1.5 in RG 4.21.

The Template includes provisions for the periodic review of Operational Practices and program elements. To ensure the site configuration and facility design are accurately portrayed, periodic reviews are included in the template to:

- assess leaks and spills associated with SSCs,
- assess analytical laboratory capabilities for providing sample results,
- assess the ground water monitoring program at a determined frequency to ensure timely detection of inadvertent radiological releases to the ground water,
- assess on an established frequency, those work practices that involve radioactive material and where a credible mechanism exists for this material to reach ground water,
- assess the adequacy of current site hydrology studies and establish additional reviews based upon new construction activities,
- assess site characterization of geology and hydrology to understand onsite ground water flow and transport characteristics,
- assess the site protocol for responding to detected leaks and spills,
- assess the training and qualification of personnel,
- assess the installation of new or modified equipment.

It is the position of the NRC staff that adequate implementation of the NEI 08-08 Template encompasses the following elements:

- Adherence to the guidance provided in EPRI-TR-1016099. Any deviations from EPR-TR-1016099 constitute an exception to the NEI 08-08 Template, and are to be identified as such during the application process.
- SSC review periods of 5 years or less. Review periods of greater than 5 years are a deviation from the guidance provided in EPRI-TR-1016099; therefore, constitute an exception to the NEI 08-08 Template and should be identified as such during the application process.

The staff has reviewed the proposed NEI 08-08 and found that it is acceptable in describing the operational and programmatic elements, and controls for minimizing contamination of the facility, consistent with the requirements of 10 CFR 20.1406.

### 3.2.3 Minimization of Environmental Contamination

NEI 08-08 Template Section 4, “Guides for Minimizing Contamination to the Environment,” addresses site characterization of geology and hydrology, along with an evaluation of predominant ground water flow characteristics utilizing the guidance in NEI 07-07 [Reference 5.8] and EPR-TR-1016099 [Reference 5.9]. NEI 08-08 provides guidance to review past and new hydrologic and geologic studies, identifying any potential pathways for ground water contamination migration from on-site to off-site locations, establishing a frequency for periodic reviews of site hydrogeology studies, and updating the relevant sections of the FSAR with any hydrological or structural changes as necessary. Commitments to perform site monitoring to detect and track contaminant migration, and sampling and analysis of ground water near any sources of contamination are also specified in NEI 08-08.

The template includes provisions for minimizing contamination of the environment to meet the requirements of 10 CFR Section 20.1406 and the intent of the guidance provided in RG 4.21. NEI 08-08 provides guidance for developing, periodically updating, and applying a hydrogeologic conceptual site model to characterize ground water flow and transport after the construction of a plant. The information derived from the conceptual site model will be valuable in predicting and remediating any ground water contaminations should they actually happen. NEI 08-08 also specifies the provisions for identifying and describing site procedures and programs that document ground water contamination monitoring. Early detection of ground water contamination is essential to minimize contamination of the environment and the cost of remediation

The staff has reviewed the proposed NEI 08-08 and found that it is acceptable in describing the operational and programmatic elements, and controls for minimizing contamination of the environment, consistent with the requirements of 10 CFR 20.1406.

### 3.2.4 Facilitation of Decommissioning

NEI 08-08 Template Section 5 addresses programmatic elements for facilitation of decommissioning, including design and operational features and decommissioning records. The template follows the intent of the guidance of RG 4.21. The NEI 08-08 Template provides provisions for establishing a remediation protocol to prevent migration of licensed material off-site and decommissioning impacts consistent with EPRI-TR-1016099 and NEI 07-07. The

NEI 08-08 Template also recognizes that IE Bulletin No. 80-10 provides additional information regarding system interactions relevant to minimizing contamination.

NEI 08-08 Template includes provisions to ensure that decommissioning records are retained and retrievable to meet the requirements of 10 CFR 50.75(g) and 10 CFR 72.30(d). NEI 08-08 Template endorses using the decommissioning records documented over the life-cycle of the facility to assist in development of a historical assessment of the site and facility and to determine facility areas' classifications for decommissioning surveys as described in NRC RIS 2002-02 [Reference 5.11] and NUREG 1757 [Reference 5.12].

The template includes requirements for administrative measures to ensure decommissioning records meet the requirements of 10 CFR 50.75(g) and 10 CFR 72.30(d). NEI 08-08 states that records of instances of facility environmental contamination and operational events that may have an impact on decommissioning or result in residual contamination will be documented and saved in a retrievable form. This recorded and documented information will be utilized to assess and efficiently decommission the facility and site following decommissioning guidance.

The staff has reviewed the proposed NEI 08-08 and found that it is acceptable in describing the operational and programmatic elements, and controls, for facilitating the decommissioning of the facility consistent with the requirements of 10 CFR 20.1406.

### 3.2.5 Minimizing the Generation of Waste

NEI 08-08 Template Section 6 addresses programmatic elements for identification and minimization of waste generation following RG 4.21 guidance. The generic program will include consideration of options to implement measures that identify and minimize waste generation along with radioactivity levels over the life-cycle of the facility, including decommissioning. Additionally, the approach used to identify the radioactive components and the waste that results from operations and processing of significant radioactive components will be documented. Commitments for the waste management program to periodically assess the waste stored onsite and to include additional onsite storage when other disposal or treatment options are not available are noted. Storage facility decontamination and decommissioning considerations are also specified in NEI 08-08.

The 564<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, July 8-10, 2009, reviewed NEI 08-08, Revision 1, "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination" [Reference 5.17]. As a result, the committee recommended the definition of "radiologically significant" be changed by revising the "significance" threshold to address unexpected radiological conditions resulting from spills, leaks, unplanned releases or the identification of radioactive materials in unexpected locations that could have an adverse impact on license termination under Subpart E of 10 CFR Part 20. The NRC staff verified that the revised definition of "radiologically significant" presented in NEI 08-08, Revision 3, "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination," is satisfactory.

The template includes provisions for a radioactive waste management program and onsite storage of radioactive waste. NEI 08-08 discusses documenting the radioactive waste that will result from operations and processing and identification of significant radioactive components

used in the facility. This information contributes to understanding measures used to minimize life-cycle radioactive waste generation. The storage of radioactive waste onsite will be periodically assessed.

The staff has reviewed the proposed NEI 08-08 and found that it is acceptable in describing the operational and programmatic elements, and controls for minimizing the generation of waste, consistent with the requirements of 10 CFR 20.1406.

#### 4.0 CONCLUSION

The NRC staff used 10 CFR Section 20.1406 and the guidance of SRP Chapters 11 and 12, DC/COL-ISG-06, and RG 4.21 as the bases for evaluating the acceptability of the NEI 08-08 Template. The NRC staff has determined that NEI 08-08, "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination" is consistent with regulatory requirements, and the intent of regulatory guidance for a life-cycle minimization of contamination program as outlined in Section 2.0 of this evaluation. With implementation in accordance with the milestones described in Section 3.0, and the Radiation Protection program license condition described in COL Safety Analysis Report Section 13.4, NEI 08-08, provides an acceptable approach for an effective ground water protection program that meets the requirements of 10 CFR Section 20.1406, with verification of the program during the construction stage.

Accordingly, the NEI 08-08 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 life-cycle minimization of contamination program available for NRC inspection and verification prior to fuel load.

Under the requirements of SECY 05-0197, the implementation of the minimization of contamination program identified in NEI Template 08-08, does not require inspection, test, analysis, and acceptance criteria in a design certification or COL application, because the program is clearly and sufficiently described in terms of the scope and level of detail.

The NRC staff review concluded that the provisions in NEI 08-08 Template clearly and sufficiently describe the operational and programmatic elements needed to comply with 10 CFR Section 20.1406. This enables the NRC staff to make a reasonable assurance finding of acceptability for issuance of a COL with verification, during the construction stage, of an operational life-cycle minimization of contamination program, which complies with the applicable regulations and guidance.

5.0 REFERENCES

- 5.1 Bell, J.B, NEI to the NRC, "NEI 08-08, Revision 3, Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination, September 2009," ADAMS Accession Number ML092740379.
- 5.2 Bell, J.B, NEI to the NRC, "Generic Templates on Radioactive Wastes and Radiation Protection Programs and Related Content of Final Safety Analysis Reports, August 10, 2007."
- 5.3 Title 10 of the *Code of Federal Regulations*, Section 20.1406, Minimization of Contamination.
- 5.4 RG 1.206 "Combined License Applications for Nuclear Power Plants (LWR Edition)." Revision 0, June 2007.
- 5.5 RG 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning."
- 5.6 NUREG-0800, SRP Section 12.3-12.4, "Radiation Protection Design Features," March 2007.
- 5.7 SECY-05-0197, "Review of Operational Programs in Combined License Applications and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," February 22, 2006.
- 5.8 NEI 07-07, "Industry Ground Water Protection Initiative – Final Guidance Document," August 2007.
- 5.9 EPRI-TR-1016099, "Ground Water Protection Guidelines for Nuclear Power Plants," January 2008 (Public Edition).
- 5.10 DC/COL-ISG-06, "Interim Staff Guidance on Evaluation and Acceptance Criteria for 10 CFR Section 20.1406 to Support Design Certification and Combined License Applications," October 2009.
- 5.11 RIS 2002-02, "NRC Regulatory Issuance Summary 2002-02 Lessons Learned Related to Recently Submitted Decommissioning Plans and License Termination Plans," January 2002.
- 5.12 NUREG-1757 "Consolidated Decommissioning Guides," September 2006.
- 5.13 NEI 07-03A "Generic FSAR Template Guidance for Radiation Protection Program Description," May 2009.
- 5.14 IE Bulletin No. 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment."

- 5.15 NUREG/CR-6204, "Questions and Answers Based on Revised 10 CFR Part 20."
- 5.16 Bonaca, Mario V., NRC ACRS Chairman to R.W. Borchart, NRC EDO, , "Draft Template Nei-08-08, "Generic FSAR Template Guidance For Life Cycle Minimization of Contamination," and Draft DC/COL Interim Staff Guidance - 06, July 22, 2009," Agencywide Documents Access and Management System Accession Number ML092010544.
- 5.17 Bell, J.B, NEI to the NRC, "NEI 08-08, Revision 1, Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination, May 12, 2009."

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(Revised 10/07/2009)

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## **APPENDIX C – NRC REQUESTS FOR ADDITIONAL INFORMATION**



NEI 08-08 "Generic FSAR Template Guidance For Life Cycle Minimization of Contamination" RAI and Comment Resolution

ADAMS Document # : ML092990142 Date: 10/26/2009

Item	Meeting Discussion Date	ADAMS Accession #	NEI 08-08 Rev #	Section	Page	NRC Comment or Question	NEI Response Date	ADAMS Accession #	NEI Response/Resolution	Resolved - NRC (Y/N)	Item # Cross Ref
1	2/18/2009	ML090550239	Rev 0	Cover	2	<p>The NEI 08-08 Submittal letter notes that the applicable sections of TR-1016099 forms the technical basis for NEI 08-08 and that NEI 08-08 is "consistent with" TR-1016099. It is not clear what is meant by the term "consistent with", and it is not clear which, if any sections, of TR-1016099 and/or NEI 07-07 are not considered applicable and are not endorsed.</p> <p>1. Please describe to what extent and how TR-1016099 should be used in conjunction with NEI 08-08.</p> <p>2. Please describe to what extent and how NEI-07-07 should be used in conjunction with NEI 08-08.</p>	3/6/2009	ML090680476	<p>Resolved in Draft Revision 1A (See the 3rd paragraph to Section 2 of NEI 08-08 for the detail on the relevant sections of 07-07).</p> <p>"The technical basis for the program for early detection of leakage technical bases is the Industry Ground Water Protection Initiative-Final Guidance Document NEI 07-07 Section 1.0 Ground Water Protection Program."</p> <p>The EPRI Groundwater Protection Guidelines provides <u>detailed</u> technical guidance in the accomplishment of NEI 07-07 and NEI 08-08.</p>	Yes	X-Ref Item #37
2	2/18/2009	ML090550239	Rev 0	3.1.4.a	3	<p>Define or explain the term "credible mechanisms." It is unclear why this guide considers only outdoor facilities. Do the applicants consider indoor facilities?</p>	3/6/2009	ML090680476	<p>Resolved in Revision 1 &amp; 1A</p> <p>Inserted between 3.1.4 and a: NOTE: a "credible mechanism for the licensed material to reach ground water" is considered one wherein the failure of a single barrier between the SSC and the environment could result in inadvertent contamination of ground water or native soil.</p> <p>Control of contamination in indoor facilities is under the RP program as described in Section 2 of Revision 1 of NEI 08-08.</p>	Yes	none
3	2/18/2009	ML090550239	Rev 0	3.1.2	3	<p>Part 3.1.2 of NEI 08-08 states that the facility will include designated areas for maintenance, decontamination, and storage when dealing with radioactive materials and contaminated areas will be segregated from contaminated areas to assist in minimizing facility contamination. However, radioactive materials may have to be transported from one station to another within the facility and may need to be passed through clean areas.</p> <p>1. Identify that administrative controls should be established to prevent the spread of contamination during this type of transport as described in Regulatory Guide 4.21 A-1 v.</p>	3/6/2009	ML090680476	<p>Resolved in Revision 1A.</p> <p>Revision of section 2 of NEI 08-08 addressed this concern. "The radiation protection program addresses the handling of radioactive materials including the control of contamination inside indoor structures or facilities and the movement of radioactive materials from one part of the site to another."</p>	Yes	none

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4	2/18/2009	ML090550239	Rev 0	3.1.4.a	3	Is it possible to better define the term "reasonably expected?" Is it intended to mean a scenario that could result in an uncontrolled, unmonitored release?	3/6/2009	ML090680476	Resolved in Revision 1 and 1A.  NOTE: "reasonably expected" takes into account the maintenance history, condition, or age of the SSC as determined during the evaluation of the SSC described in this step and could result in an uncontrolled release to the environment by some means other than an ODCM-credited release point.  Reference 6, IE Bulletin 80-10, was also added.	Yes	X-Ref Item #38 & #39
5	2/18/2009	ML090550239	Rev 0	3.1.4.a	3	What is the threshold value to be used for notification of State/Local stakeholders when an offsite leak/release is detected?	3/6/2009	ML090680476	NEI position is that notification of State/local stakeholders is not part of NEI 08-08 and that voluntary communication covered in NEI 07-07 Section 2 was specifically excluded from NEI 08-08 since there is no requirement for this in RG 4.21 or 10 CFR 20.1406. Additionally, new reactors will be committed to NEI 07-07 via the voluntary commitment to the groundwater protection initiative. The staff position is that commitment to using NEI 08-08 should include a commitment to using NEI 07-07 for developing stakeholder input and notification thresholds. This will be addressed in the Safety Review of NEI 08-08.	Yes	X-Ref Item #45
6	2/18/2009	ML090550239	Rev 0	3.2.2.a	4	Modify text of bullet as follows to allow for flow paths that may not be strictly "down gradient" on a potentiometric map (i.e. preferential flow paths created by site heterogeneity).  "Using the hydrology and geology studies developed under 4.1.below, consider <b>effective</b> placement of ground water monitoring wells <del>downgradient from</del> relative to the <del>plant source and receptor</del> but within the boundary defined by the site license."	3/6/2009	ML090680476	Discussed and resolved at the 2/18/09 meeting. Licensees will also follow the guidance in EPRI TR-1016099 to install monitoring wells that ensure prompt detection of leakage (see 3.2 title).	Yes	none

**NEI 08-08 "Generic FSAR Template Guidance For Life Cycle Minimization of Contamination" RAI and Comment Resolution**

ADAMS Document # : ML092990142 Date: 10/26/2009

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7	2/18/2009	ML090550239	Rev 0	3.2.2.a	4	Define boundary? Or are the site specific procedures required to define it?	3/6/2009	ML090680476	Discussed at the 2/18/09 meeting and resolved in Revision 1 of NEI 08-08. The following was added to 3.22.1 for clarity: "(i.e. the boundary defined for compliance with 10 CFR part 20)."	Yes	none
8	2/18/2009	ML090550239	Rev 0	3.1.4.g	4	What is the purpose of the periodic reviews SSCs? Is periodic scoping to add new systems, structures, and components (SSCs) or elevate concern for existing SSCs IAW Section 8.2 of the EPRI Guide TR1016099, Groundwater Protection Guidelines for Nuclear Power Plants, January 2008 (Public Edition)	3/6/2009	ML090680476	Resolved in revision 1 of NEI 08-08. Clarifying language added to Section 2: "The applicant's program involves an initial and periodic evaluation of the facility SSCs, work activities, and generic issues. The frequency of the evaluation should reflect factors that affect the likelihood and potential consequences from an inadvertent loss of radioactive material to the environment."	Yes	none
9	2/18/2009	ML090550239	Rev 0	3.2.2.c	4	More clearly explain or define clearly the term "analytical sensitivity requirements." Specify who are the "external stakeholders" that are responsible for the analyses.	3/6/2009	ML090680476	Resolved in Revision 1 of NEI 08-08.  Clarifying note to Section 3.2.2.c added to address this issue. Note: Analytical sensitivity levels are Lower Limits of Detection (LLD) and external stakeholders (State & local authorities) LLD's will vary from site to site.	Yes	none
10	2/18/2009	ML090550239	Rev 0	3.3.1	5	NEI 08-08 section 3.3.1 explicitly mentions RG 4.21 Section A-1 but does not mention the other sections of Appendix A.  1. Please describe the relevance of the guidance of other sections of RG 4.21 Appendix A to NEI 08-08.	3/6/2009	ML090680476	Resolved in Revision 1 of NEI -08-08. Deleted the specific reference to RG 4.21 Section A-1.  The reference is "(Reference 5)" as revised in Revision 1 to NEI 08-08.	Yes	none
11	2/18/2009	ML090550239	Rev 0	3.3	5	Modify the title of Section 3.3 to read "Minimize the Probability of the Release of Contamination from Undetected Leaks."	3/6/2009	ML090680476	Resolved in Revision 1 of NEI 08-08. Changed to "Minimize the Potential of the Release of Contamination from Undetected Leaks"	Yes	none
12	2/18/2009	ML090550239	Rev 0	3.4	5	Modify the title of Section 3.4 to read "Reducing the Need for Decontamination of Equipment and Structures."	3/6/2009	ML090680476	Resolved in Revision 1 of NEI 08-08. Changed to "Reducing the Need for Decontamination of Equipment and Structures".	Yes	none

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ADAMS Document # : ML092990142 Date: 10/26/2009

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13	2/18/2009	ML090550239	Rev 0	3.5.2	7	Clarify the term "Significance of the event." Does this mean radiologically significant? Is it intended to be reportable under 10CFR50.72 or 50.73 (NUREG-1022)	3/6/2009	ML090680476	Resolved in Revision 1 and 1A of NEI 08-08. Added reference to the definition of "radiologically significant" in RG 4.21 page 6 footnote 1.	Yes	none
14	2/18/2009	ML090550239	Rev 0	4.1.1.a	7	Specify "the ground water flow characteristics." Again, this item is inconsistent with item 4.1.1.c - The first one says "predominant ground water flow" while the later one infers (all) potential ground water.	3/6/2009	ML090680476	Discussed and resolved during the 2/18/09 meeting. The language used is from NEI 07-07. Section 4.1.1a requires licensees to determine predominant ground water flow characteristics and gradients. Additionally Section 4.1.1c requires the licensee to identify potential pathways for migration.	Yes	none
15	2/18/2009	ML090550239	Rev 0	4.1.1	7	Section states that Reference 4 includes additional information to assist in determining 'substantial' items. Please include an explanation of how to make such a "significance" determination when NEI 08-08 is described to be consistent with reference 4. NEI 08-08 guidance does not ensure a similar determination would be made for the same conditions at different sites. NEI 08-08 could require site procedures to establish the substantial threshold (i.e., double parentheses).	3/6/2009	ML090680476	Resolved in Revision 1 and 1A of NEI 08-08.  The existing note has been made more visible and relocated after Section 4.1.1.e.	Yes	X-Ref Item #19
16	2/18/2009	ML090550239	Rev 0	4.1.1	7	Are "current site conditions" are intended to be post-construction?	3/6/2009	ML090680476	Resolved in Revision 1 and 1A of NEI 08-08.  New text added to Section 2 in Revision 1A of NEI 08-08 as follows: "The applicant's program involves an initial and periodic evaluation of the facility SSCs, work activities, and generic issues. The frequency of the evaluation should reflect factors that affect the likelihood and potential consequences from an inadvertent loss of radioactive material to the environment.	Yes	none

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17	2/18/2009	ML090550239	Rev 0	3.5.2	7	NEI 08-08 3.5.2 provides guidance for the applicants regarding actions to be taken following an event. It does not include an evaluation of the extent of condition/applicability to related facility operations noted in RG 4.21 regulatory position 1.6.  1. Please describe how NEI 08-08 addresses the extent of condition considerations discussed in RG 4.21 RP 1.6.	3/6/2009	ML090680476	Resolved in Draft Revision 1 and 1A of NEI 08-08. RG 4.21, RP 1.6, is addressed in NEI 08-08 Section 3.5. The extent of condition considerations in RG 4.21, RP 1.6, are described in NEI 08-08 Section 3.5.2. Section 3.5.2.b in Revision 1 to NEI 08-08 states: "Evaluation of the extent of condition/applicability to similar related facility operations", and Appendix A to NEI 08-08 is to be completed by the COL applicant.	Yes	none
18	2/18/2009	ML090550239	Rev 0	4	7	This section proposes developing and updating a conceptual site model (CSM) but without describing the objectives of the modeling and how to apply it to minimizing contamination. Also, this section should address the connection between this proposed ground water protection initiative and SRP 2.4.12 and 13. There are many parallel and duplicate efforts between the two documents. Clarify where responsibility is described.	3/6/2009	ML090680476	Discussed and resolved at the 2/18/09 meeting. As stated in 4.1.1, the objective of the site conceptual model is so that the applicant can understand the "...predominant ground water flow characteristics based upon current site conditions." The CSM as described in NEI 08-08 is the baseline evaluation for post construction. The intent is not for meeting the requirements included in SRP Sections 2.4.12 and 2.4.13.	Yes	none
19	2/18/2009	ML090550239	Rev 0	4.1.1.d.iii	7	NEI 08-08 should clarify who should be responsible for revising the CSM in cases there are changes of off-site water uses or ground water pumping rates	3/6/2009	ML090680476	Discussed and resolved at the 2/18/09 meeting with no change required. The applicant is responsible to ensure that the site conceptual model continues to be valid. As indicated in the Note under 4.1.1 above, the licensee retains a professional geologist/hydrologist to perform this function.	Yes	X-Ref Item #15
20	2/18/2009	ML090550239	Rev 0	4.3.2	8	Suggest modification of text to include reference to transport characteristics and eliminate the word predominant (too vague).  "The site characterization of geology and hydrology will be reviewed to ensure an understanding of <b>predominant</b> groundwater flow <b>and transport</b> characteristics based upon this final site configuration."	3/6/2009	ML090680476	Discussed at the 2/18/09 meeting and resolved in revision 1 and 1A of NEI 08-08. Related to issues identified in Section 4.1 concerning groundwater modeling.	Yes	X-Ref Item #34

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21	2/18/2009	ML090550239	Rev 0	4.3	8	Will the post-construction site characterization analysis (Final CSM) address the use of chemicals that can affect radionuclide transport in the surface and subsurface zone?	3/6/2009	ML090680476	Discussed at the 2/18/09 meeting and resolved. The site conceptual model is updated periodically to reflect changes in site conditions which should include all affects on radionuclide transport.	Yes	none
22	2/18/2009	ML090550239	Rev 0	5.2.2	9	Section 5.2.2 of NEI 08-08 states the applicant will ensure that records of leaks, spills and remediation efforts are retained and retrievable to meet the requirements of 10 CFR 72.30 (g). However, decommissioning records are covered under 10 CFR 72.30 (d).  1. Change the statement to 10 CFR 72.30 (d).	3/6/2009	ML090680476	Discussed at the 2/18/09 meeting. Typographical error corrected in revision 1 of NEI 08-08.	Yes	none
23	2/18/2009	ML090550239	Rev 0	5.1.2	9	Section 5.1.2.b requests that the COL applicant evaluate the potential for detectable levels of licensed material from planned releases. It is unclear from reading this section how the COL applicant is to evaluate the potential for these detectible levels of licensed material resulting from planned releases.  1. Modify this section to clarify what specifically the COL applicant is being asked to evaluate.	3/6/2009	ML090680476	Resolved in revision 1 of NEI 08-08. Revised Section 5.1.2 b to state " Note: Applicants should use the first 5 years of effluent release data to perform the evaluation in section 5.1.2b "	Yes	X-Ref Item #42
24	2/18/2009	ML090550239	Rev 0	5.2.3	9	Insert the word "potential" before the word "hazard" in the second line of Section 5.2.3.	3/6/2009	ML090680476	Resolved in revision 1 of NEI 08-08.	Yes	none
25	2/18/2009	ML090550239	Rev 0	6.1.1	10	Section 6.1.1 specifies that the COL applicant is to identify significant radioactive components used in the facility and the waste that will result from operations and processing.  1. Clarify what is meant by "significant."	3/6/2009	ML090680476	Resolved in revision 1 of NEI 08-08. Section 6.1.1 revised to include examples of large components to be considered.  Clarification was provided by example: "(for example steam generator, reactor head, pressurizer, reactor coolant pump.)"	Yes	none

**NEI 08-08 "Generic FSAR Template Guidance For Life Cycle Minimization of Contamination" RAI and Comment Resolution**

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26	2/18/2009	ML090550239	Rev 0	6.2.2	11	<p>Section 6.2.2 specifies that the COL applicant is to perform periodic assessments of the waste stored onsite.</p> <p>1. Clarify what is meant by "periodic." 2. What guidance governs the assessment?</p>	3/6/2009	ML090680476	<p>Resolved in revision 1 of NEI 08-08. Periodic to be defined by licensee. The assessment is to enable the licensee to evaluate on-site storage capacity based on generation rate and potential changes in future disposal requirements and availability. References were added for RIS 2008-32 and/or EPRI interim storage guidelines. Periodicity is addressed by the references that were added.</p>	Yes	none
27	2/18/2009	ML090550239	Rev 0	2, 3.1.1	2, 3	<p>As stated in Section 2, NEI 08-08 provides operating programs, processes and/or procedures to supplement Standard Design, design features to meet 10 CFR 20.1406. However, due to the nature of the regulation, there are many ways to meet 10 CFR 20.1406. In that case, there may be operational programs that may need to be incorporated due to specific design features, or lack thereof. Section 3.1.1 and Appendix A direct the applicant to provide necessary pointers to design features in the DCD and COL as needed to avoid additional operational programs. However, NEI 08-08 does not describe what a COL applicant must do if these design features are not included.</p> <p>1. Explain how an applicant could use NEI 08-08 if these design features were not included in their plant design.</p>	3/6/2009	ML090680476	<p>Resolved in Draft Revision 1A of NEI 08-08.</p> <p>New text was added to paragraph 3 of Section 2 of NEI 08-08 describing the SSC reviews. "The applicant's program involves an initial and periodic evaluation of the facility SSCs, work activities, and generic issues. The frequency of the evaluation should be reflect factors that affect the likelihood and potential consequences from an inadvertent loss of radioactive material to the environment."</p> <p>NEI 08-08 is based on performing an SSC assessment using section 3.1.4. If the design features require additional measures, the applicant would identify the issues in the evaluation of SSCs. If, for example, a system were not designed with secondary containment measures, the evaluation of SSCs under 3.1.4 would likely cause the applicant to implement additional leak detection or monitoring programs in order to ensure timely detection of leaks and may affect the frequency of preventative maintenance to preclude equipment failure."</p>	Yes	none

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28	2/18/2009	ML090550239	Rev 0	2, 3.1.1	2, 3	<p>NEI 08-08 Guidance section 2, Applicability and Controls, notes that design features of a "Standard Design" when supplemented with program features are adequate to comply with 10CFR20.1406. This portion of the standard does not reference COL provided design features. COL design features are discussed in the note following 3.1.1.</p> <p>1. Please revise the Applicability and Controls sections, so that the two areas are consistent and that Standard Design and COL design features are both addressed.</p>	3/6/2009	ML090680476	<p>Resolved in Draft Revision 1A of NEI 08-08. Section 2 is a general discussion of applicability and controls. Section 3 provides the specific details.</p> <p>Revision of Section 2 of NEI 08-08 also addressed this issue. "This template applies to the applicant that has selected a Standard Design, as defined by 10 CFR Part 52, with design features and COL described design features, that when supplemented with operating programs, processes, and procedures as needed, are adequate to comply with 10 CFR 20.1406. The operating programs, processes and/or procedures identified within this template supplement those adequate design features to provide reasonable assurance that 'spills, leaks, and inadvertent discharges of radioactive effluents will be prevented or minimized."</p>	Yes	X-Ref Item #43
29	2/18/2009	ML090550239	Rev 0	3.1.4 3.2.1 3.2.2 3.5.1	3, 4, 6	<p>In several sections of NEI 08-08, the focus is only on leaks and spills that have credible mechanisms for licensed material to reach ground water. Although minimizing contamination to groundwater is important, 10 CFR 20.1406 is for minimizing contamination for the facility and all site environs (including soil, surface water and groundwater). Additionally, NEI 08-08 states the applicant should be consistent with EPRI Report 1016099, which states licensees should evaluate and monitor SSCs with credible potential for releasing radioactive liquid to soil and groundwater. Therefore,</p> <p>1. Explain why section 3.1.4 tells the applicant to evaluate SSCs that contain or could contain licensed material for which there is a credible mechanism for licensed material to reach groundwater; and</p>	3/6/2009	ML090680476	<p>Discussed and resolved during the 2/18/09 meeting, no changes required. Section 3.1 addresses many processes and programs that are individual components in a broad program. The most credible method for contamination from leaks or spills to leave the licensee's control, and to potentially migrate off-site, is through ground water; absent excavation. Contamination in soil would only leave the site if the contamination desorbs or is transferred into ground water. The EPRI document provides additional detail on how to achieve the requirements in NEI 08-08.</p> <p>The RP program addresses leaks and spills inside a building that are prevented from reaching ground water.</p>	Yes	none
30	2/18/2009	ML090550239	Rev 0	3.1.4 3.2.1 3.2.2 3.5.1	3, 4, 6	<p>2. Explain why section 3.2.1 states only monitoring and routine surveillance is for accessible systems which there is a credible mechanism for licensed material to reach groundwater; and</p>	3/6/2009	ML090680476	<p>Discussed and resolved during the 2/18/09 meeting, no changes required. Section 3.3 compliments 3.2.1 and addresses leak detection from SSCs that are not readily accessible.</p>	Yes	X-Ref Item #29

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31	2/18/2009	ML090550239	Rev 0	3.1.4 3.2.1 3.2.2 3.5.1	3, 4, 6	3. Explain why section 3.5.1 a. and b. only review work practices involving SSCs that have a credible mechanism for licensed material to reach groundwater.	3/6/2009	ML090680476	Discussed and resolved during the 2/18/09 meeting, no changes required. The focus of NEI 08-08 is to control contamination. As such, those work practices that can result in the spread of contamination through leaks or spills, and have a credible mechanism to reach ground water, should require evaluation.	Yes	X-Ref Item #29
32	2/18/2009	ML090550239	Rev 0	3.1.4, 3.3.1	3, 5	NEI 3.1.4(a) addresses outdoor tanks, but does not discuss imbedded tanks or sumps. These types of tanks/sumps are discussed in 3.3.1.  1. NEI 3.1.4(a) should be changed to make it consistent with 3.3.1 and RG 4.21	3/6/2009	ML090680476	Addressed in Draft Revision 1 of NEI 08-08. Section 3.1.4 of NEI 08-08 revised to state: "Note: A 'credible mechanism' for the licensed material to reach ground water is considered one wherein the failure of a single barrier between the SSC and the environment that could result in inadvertent contamination of ground water or native soil." Outdoor tanks are one item in the list of examples of SSCs of interest. EPRI Guidance Statement 3.2.1a includes sumps and drains.  Sections 3.1.4a and 3.3.1 provide examples and are not intended to all inclusive lists. Section 2 addresses other program areas: "This template recognizes that other site programs, such as the maintenance and surveillance program, radiation protection program, help to minimize contamination of the facility and the environment. The radiation protection program addresses the handling of radioactive materials including the control of contamination inside indoor structures or facilities and the movement of radioactive materials from one part of the site to another."	Yes	X-Ref Item #38
33	2/18/2009	ML090550239	Rev 0	3.1.1, 4.1.1, 4.3	3, 7 & 8	Clarify the difference between the information requested in the paragraphs identified by "Note" and the information requested by the double parentheses. The format of the "Notes" should be consistent in each section where they are listed.	3/6/2009	ML090680476	Discussed during the 2/18/09 meeting and addressed in Draft Revision 1 and 1A of NEI 08-08. Use of double parentheses (()) reviewed and corrected for consistency during Revision process.	Yes	none

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34	2/18/2009	ML090550239	Rev 0	3.5, 4.1, 4.2	6, 7 & 8	<p>The introduction to NEI 08-08 states that the site specific information provided in the double parentheses will be provided by the applicant as specified in FSAR Section 13.4. NEI 08-08 contains ten locations where site specific information is identified by the use of double parentheses.</p> <p>1. Verify, as stated in Section 2 of NEI 08-08, that the COL applicant will provide the site specific information indicated in the portions of the template identified by double parentheses at Milestone 2 (prior to initial receipt of nuclear fuel) of the Operational Radiation Protection Program.</p> <p>2. Since the information called for in the double parenthesis for Section 3.5.1 does not cover the information described in Section 3.5.2, relocate the information in the double parenthesis to the end of Section 3.5 and change the reference in this double parenthesis from 3.5.1 to 3.5.</p> <p>3. Add double parentheses to Sections 4.1 and 4.2 specifying that the COL applicant should provide site specific information for the material described in those sections.</p>	3/6/2009	ML090680476	<p>Addressed in Draft Revision 1 and 1A of NEI 08-08. The milestone to develop site specific procedures and programs, and for providing information, was changed to 'prior to initial fuel load' (Radiation Protection Milestone 3) in Sections 1, 2, &amp; 4.3. Double parentheses added to Section 3.5.2.</p> <p>The use of (()) was reviewed, and corrected as needed, in Revision 1 of NEI 08-08</p>	Yes	none
35	2/18/2009	ML090550239	Rev 0	4.1.2	7 (8)	<p>Define "release scenarios." Are these meant to be an analysis of potential events (leaks, spills and groundwater contamination?)</p>	3/6/2009	ML090680476	<p>Addressed in Draft Revision 1 of NEI 08-08. Replaced "scenarios" with "pathways".</p>	Yes	none
36	2/18/2009	ML090550239	Rev 0	App-A	A-3	<p>NEI 08-08 does not discuss maintenance/surveillance of building seams, penetration seals. While 08-08 does discuss the implementation of a surveillance program, it is otherwise completely silent with respect to penetration integrity. The only place joint integrity inspection is noted is in Rad Waste pipe trenches.</p> <p>1. Please describe the surveillance and maintenance requirements with respect to below grade building seams and pipe/conduit penetration seals.</p>	3/6/2009	ML090680476	<p>Addressed in Draft Revision 1 of NEI 08-08, and discussed further during the 3/20/09 meeting.</p> <p>Added references to other site programs and procedures, such as those implementing the Maintenance Rule, address maintenance and surveillance of building seams, penetration seals, etc.</p>	Yes	none

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37	3/12/2009	ML090770037	Draft Rev 1	Cover	2	The revised information in section 2 of Draft revision 1 still did not clearly convey how to use the EPRI and NEI 07-07 Suggest wording as follows in the 3rd paragraph to Section 2 of NEI 08-08 for the detail on the relevant sections of 07-07: "For new reactor applications the technical basis for the program for early detection of leakage is the Industry Ground Water Protection Initiative-Final Guidance Document NEI 07-07 Section 1.0 Ground Water Protection Program." The EPRI Groundwater Protection Guidelines provides detailed technical guidance in the accomplishment of NEI 07-07 and NEI 08-08, and should be used to implement a comprehensive approach to the operational aspects of the new reactor GPI. (CHPB).	3/20/2009	ML090790766	Addressed in Draft Revision 1 and 1A of NEI 08-08. This issue was addressed under Item 1 above. The revisions described there address revised wording in Section 2 and a stronger tie to NEI 07-07 the EPRI TR.	Yes	X-Ref Item #1
38	3/12/2009	ML090770037	Draft Rev 1	3.1.4.a	3	3.1.4. a still states "refueling water storage tanks, if outdoors". The statement in 3.3.1 is more accurate. Please revise to be consistent. (CHPB).	3/20/2009	ML090790766	Addressed in Draft Revision 1 and 1A of NEI 08-08. Changes are described in Items 4 and 32 above. Notes added concerning 'credible mechanism' and reference to IE Bulletin 80-10 for additional examples. Examples included in Sections 3.1.4.a and 3.3.1 are not meant to be exhaustive or exact duplicates of each other.	Yes	X-Ref Item #4 & #32
39	3/12/2009	ML090770037	Draft Rev 1	3.1.4.a	3	Although Reference 6 was added, there were no discussions of the IE Bulletin 80-10 systems and considerations that would also be applicable to 10CFR20.1406 within NEI 08-08.(CHPB)	3/20/2009	ML090790766	Addressed in Draft Revision 1 and 1A of NEI 08-08. Changes are described in Item 4 above. Added note referencing IE Bulletin 80-10 for additional examples.	Yes	X-Ref Item #4
40	3/12/2009	ML090770037	Draft Rev 1	3.5.2	7	The term "significance of the event" may take on additional meaning with RG 4.22 and 10CFR20.1406(c) which will direct that licensees evaluate leaks or spills which will have a significant impact on decommissioning. (CHPB)	3/20/2009	ML090790766	Discussed at the 3/20/09 meeting with the following comments noted. Although noteworthy in the future, no change of NEI 08-08 at this time is required. This will have to be addressed when the guidance is issued.	Yes	none

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41	3/12/2009	ML090770037	Draft Rev 1	4.2	9	Is this monitoring system for groundwater monitoring or facility leakage monitoring or for both? It appears that this for Groundwater contamination monitoring, thus recommend the following changes: Insert "groundwater" in the first sentence of each section (4.2.1 & 4.2.2 prior to the word monitoring. (RHEB)	3/20/2009	ML090790766	Addressed in Draft Revision 1 and 1A of NEI 08-08. Section 4.2 of language clarified as following: "4.2.1 The site <u>ground water</u> monitoring systems will be deployed to support the early detection of leakage and contaminant migration. These systems..with the ground."  "4.2.2 The site procedures for the <u>ground water</u> monitoring program will include a program for periodic sampling of ground water close to the potential source to verify the integrity of the system."	Yes	none
42	3/12/2009	ML090770037	Draft Rev 1	5.1.2b	9	Include the phrase, "As a minimum"; in the note when describing the evaluation time period for effluent release data. (CHPB)	3/20/2009	ML090790766	Addressed in Draft Revision 1 and 1A of NEI 08-08. Discussed during the 3-12-09 meeting and resolution described in Item 23 above. Clarified that the first 5 years of effluent data should be used for establishing baseline.	Yes	X-Ref Item #23
43	3/12/2009	ML090770037	Draft Rev 1	2, 3.1.1	2,3	COL applicants/holders who commit to a certified design approved prior to 8/20/1997 or where the COL holder will establish site specific design features to comply with 10CFR20.1406 (a), should clearly understand that the COL FSAR should identify these design features not NEI 08-08.(CHPB)	3/20/2009	ML090790766	Resolved in Draft Revision 1 and 1A of NEI 08-08. Discussed in Item 28 above. Discussion added to Section 2 (applicability and controls) an notes added to Section 3.	Yes	X-Ref Item #28
44	3/12/2009	ML090770037	Draft Rev 1	App-A	A-3	As noted on page 9 of 17 of the previous issued comments: NEI 08-08 does not discuss maintenance/surveillance of building seams, penetration seals. When describing the features to consider include this feature in the narrative under 3.1. (CHPB)	3/20/2009	ML090790766	Resolved in Draft Revision 1 and 1A of NEI 08-08. Discussed in Item 36 above. Added references to other site programs and procedures, such as those implementing the Maintenance Rule, address maintenance and surveillance of building seams, penetration seals, etc.  Building seams also identified in Appendix A: "Describe the criteria that govern the frequency of performing periodic visual inspections of areas such as; the piping in the radwaste pipe trenches to check for leaks, the floor/wall expansion joints in the radwaste pipe trenches, accessible building seams, to ensure that no spills or leaks enter unmonitored areas beneath the floors and foundations."	Yes	X-Ref Item #36

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45	3/12/2009	ML090770037	Draft Rev 1	N/A	Page 13 of 15 of first set of comments	Notification of State/local stakeholders is not part of NEI 08-08. Voluntary communication is described in NEI 07-07 Section 2 was specifically excluded from NEI 08-08.  Recommendation (26) from the Liquid Radioactive Release Lessons Learned Task Force Final Report September 1, 2006, (ML062650312) stated that Nuclear Power Plant licensees should consider entering into agreements with local and state agencies to voluntarily report preliminary information on significant radioactive liquid releases that do not otherwise trigger reporting requirements. Will the NEI 08-08 have any requirement for stakeholder notification? (CHPB)	3/20/2009	ML090790766	Discussed in Item 5 above. The staff position is that commitment to using NEI 08-08 should include a commitment to using NEI 07-07 for developing stakeholder input and notification thresholds. This will be addressed in the Safety Review of NEI 08-08.	Yes	X-Ref Item #5
46	3/12/2009	ML090770037	Draft Rev 1	3.1.4 Note		The term "inadvertent" is used in several places without defining it. It seems that this term is used for any potential contaminations rather than 'radiologically significant' contamination. Please clarify what is meant by the term. (RHEB)	3/20/2009	ML090790766	The common usage of the word inadvertent is: "Unintentional, unintended, not deliberate, involuntary, chance, not premeditated, unplanned, accidental"  The note was revised in Section 3.1.3 as follows <b>Note:</b> A 'credible mechanism' for the licensed material to reach ground water is considered one wherein the failure of a single barrier between the SSC and the environment that could result in inadvertent or <u>unintentional</u> contamination of ground water or native soil."  The word "unintentional" was also added in several places in the Revision 1A to NEI 08-08 for additional clarity.	Yes	none

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47	3/25/2009	ML090850294	Draft Rev 1A		2	<p>EPRI TR-1016099 provides detailed technical <b>bases</b> in the accomplishment of NEI 07-07 and NEI 08-08, and <b>should be</b> used to implement a comprehensive approach to the operational aspects of groundwater protection for new reactors. What if another technically sound, documented approach comparable to the program outlined in EPRI TR-1016099 is used?</p> <p>THEN this program shall be submitted to the NRC for review as part of the COL application and describe how it complies with the RG 4.21 regulatory position. Please add to template.</p>	4/4/2009	ML090960583	<p>This is covered by the existing COL process and principles of regulatory guidance. The NEI 08-08 template is only one way to demonstrate compliance with 10 CFR 20.1406 and meet the guidance contained in Regulatory Guide 4.21.</p> <p>If another technically sound program exists, the applicant can provide reference to the program and justification as part of the COL application.</p>	Yes	none
48	3/25/2009	ML090850294	Draft Rev 1A	3.1.4.a	3	<p>3.1.4.a still states "refueling water storage tanks, if outdoors". The statement in 3.3.1 is more accurate. Please revise to be consistent. (CHPB)</p> <p>NEI 08-08-R1a states on page 3 "Examples of SSCs of interest include: refueling water storage tanks, if outdoors;...". This statement should be change to : "Examples of SSCs of interest include: refueling water storage tanks if outdoors, in contact with soil or imbedded in concrete;...". This would make it more consistent with 3.3.1, and be closer to the actual intent of RG-4.21</p>	4/4/2009	ML090960583	<p>Addressed in Draft Revision 1 and 1A of NEI 08-08. Changes are described in Items 4, 32, and 38 above.</p> <p>Notes added concerning 'credible mechanism' and reference to IE Bulletin 80-10 for additional examples. Examples included in Sections 3.1.4.a and 3.3.1 are not meant to be exhaustive or exact duplicates of each other.</p>	Yes	X-Ref Items #4, #32, and #38
49	3/25/2009	ML090850294	Draft Rev 1A	3.1.4.a	3	<p>Although Reference 6 was added, there were no discussions of the IE Bulletin 80-10 systems and considerations that would also be applicable to 10CFR20.1406 within NEI 08-08.(CHPB)</p>	4/4/2009	ML090960583	<p>Addressed in Draft Revision 1A and 1B of NEI 08-08. Changes are described in Items 4 and 39 above.</p> <p>Note added reference to IE Bulletin 80-10 for additional examples. No additional discussion in the NEI 08-08 template is required.</p>	Yes	X-Ref Items #4, and #39

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50	3/25/2009	ML090850294	Draft Rev 1A	3.1.4.g	4	<p>The basis for the determination of an adequate periodic frequency is not clearly defined. EPRI TR-1016099 contains the following statement: Guidance Statement 8.2a [BASELINE]: <i>Establish and document a review cycle for the identification of potential sources of subsurface contamination. Document the rationale for selecting the frequency and methods of reviews. The frequency of the review cycle should not exceed five years.</i></p> <p><b>Recommend that a statement be added to the effect that if the periodic review frequency exceeds that noted in TR-1016099, that the applicant provide justification for a deviation from the bases document recommendation</b></p>	4/4/2009	ML090960583	<p>Addressed in Draft Revision 1A and 1B of NEI 08-08. Section 3.1.4.g revised and the following note was added:</p> <p>Note: Licensee should justify the selected period for review of the SSCs.</p>	Yes	none

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51	3/25/2009	ML090850294	Draft Rev 1A		1, 2	<p>NEI 08-08 contains inconsistent direction regarding the technical bases for NEI 08-08 and insufficient direction regarding the use of guidance other than EPRI TR-1016099.</p> <p>On page 1 it notes: EPRI Report 1016099, dated January 2008 (Reference 4) provides one acceptable approach for an effective ground water protection program and provides a <b>technical basis</b> for this template.</p> <p>On page 2 it notes: The technical basis for the program for early detection of leakage for new reactor applications is the Industry Ground Water Protection Initiative-Final Guidance Document NEI 07-07 Section 1.0 Ground Water Protection Program.</p> <p>EPRI TR-1016099 provides detailed technical <b>guidance</b> in the accomplishment of NEI 07-07 and NEI 08-08, and <b>should be</b> used to implement a comprehensive approach to the operational aspects of groundwater protection for new reactors.</p>	4/4/2009	ML090960583	<p>Addressed in Revision 1B of NEI 08-08. Section 2 was revised as follows to resolve any potential inconsistency:</p> <p>"EPRI TR-1016099 provides a detailed technical basis in the accomplishment of NEI 07-07 and NEI 08-08, and should be used to implement a comprehensive approach to the operational aspects of groundwater protection for new reactors."</p>	Yes	none
52	3/25/2009	ML090850294	Draft Rev 1A	General		<p>The template talks about using an approach that blends a process of risk-informed decisions, ALARA, practicality and cost effectiveness in considering the incorporation of design features and operational program in achieving the objectives of the template.</p> <p>However, what comes to mind is that most of features described in the template will be difficult to implement, a point noted in the template, and therefore costly and possibly excluded on cost considerations alone. As a result, the template should note that all reasonable engineered measures and operational practices should be considered in achieving the objectives of the template, but that cost alone should not be the only factor used in determining whether such measures are implemented.</p>	4/4/2009	ML090960583	<p>Addressed in Revision 1 submitted for NRC review. Wording added to Section 1 stating that cost alone should not be the only consideration when deciding to implement measures to identified in the template.</p> <p>In implementing these ALARA principles, all reasonable engineered measures...cost alone should not be the only factor used...implemented. As stated in section 2: "NEI 08-08 identifies the base operational program to supplement the standard designs."</p>	Yes	none

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Item	Meeting Discussion Date	ADAMS Accession #	NEI 08-08 Rev #	Section	Page	NRC Comment or Question	NEI Response Date	ADAMS Accession #	NEI Response/Resolution	Resolved - NRC (Y/N)	Item # Cross Ref
53	564th meeting of the ACRS, July 8-10, 2009	ML092010544	Rev 1	7. Definitions	15	<p>ACRS Recommendations</p> <p>1. The definition of the term "radiologically significant" in NEI 08-08 should be changed by revising the "significance" threshold to address unexpected radiological conditions resulting from spills, leaks, unplanned releases or the identification of radioactive materials in unexpected locations that could have an adverse impact on license termination under Subpart E of 10 CFR Part 20.</p> <p>2. NEI-08-08 should not be endorsed and ISG-06 should not be issued until a satisfactory definition of "radiologically significant" is developed.</p>	8/11/2009	ML092590596	The document was revised to address recommendations of the NRC Advisory Committee on Reactor Safeguards (ACRS) contained in letter to Mr. R.W. Borchardt, dated July 22, 2009. NEI 08-08 Revision 2 submitted 8/11/09 (ML092590608).	No	none
54	N/A	N/A	Rev 2	N/A	N/A	Review of NEI 08-08 Revision 2 by NRC staff identified a change by NEI, in addition to the revised definition of radiologically significant, that had not been previously discussed. NEI was contacted by phone to discuss. NEI felt that it was a correct editorial change, but after further discussion agreed that it should not have been changed. NEI agreed to remove the change and resubmit as NEI 8-08 Revision 3.	9/30/2009	ML092740379	Editorial change removed and document resubmitted as NEI 08-08 Revision 3.	Yes	none