February 3, 2011

Rodney McCullum, Director
Fuel Cycle Projects
Nuclear Generation Division
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION, RELATED TO NEI 10-01, INDUSTRY GUIDELINE FOR DEVELOPING A PLANT PARAMETER ENVELOPE IN SUPPORT OF AN EARLY SITE PERMIT, REVISION 0 (PROJECT NO. 689; TAC Q00341)

Dear Mr. McCullum,

By letter dated March 26, 2010, the Nuclear Energy Institute (NEI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review, NEI 10-01, Industry Guideline for Developing a Plant Parameter Envelope in Support of an Early Site Permit, Revision 0. NEI requested endorsement of NEI10-01 to ensure that the process outlined in the guidance would support NRC review needs.

The NRC staff met with you and the NEI Early Site Permit Task Force, on August 25, 2010, to discuss the scope of NEI 10-01. In the meeting, you stated that the scope of NEI 10-01 is to provide guidance to the industry on how to gather information from the various vendors whose designs the early site permit (ESP) applicant wishes to be bounded by the plant parameter envelope (PPE). NEI10-01 gathers information from the vendors but does not develop a PPE.

The NRC has no regulatory requirements for the process used by an applicant for an ESP to gather the information to create a PPE. Therefore, the NRC cannot endorse the guidance on the process used to develop a PPE. The NRC does determine whether the PPE values are sufficient to support the review, and that the PPE values are not unreasonable for consideration in the staff findings to comply with 10 CFR Part 52, Subpart A. The NRC could endorse a guidance document that developed a generic PPE without specific values for the parameters. The ESP applicant is responsible for selecting the values for their application and would take the risk that the PPE values in the ESP may not bound the design selected in the combined license application referencing the ESP.

The NRC staff requests that NEI provide a response within 30 days of the date of this letter informing the staff if NEI plans to expand the scope of NEI 10-01 to include developing a generic PPE table and address the other requests for additional information.

Sincerely,

/RA/

William Burton, Chief
Rulemaking and Guidance Development Branch
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission

Project No: 689

The NRC staff requests that NEI provide a response within 30 days of the date of this letter informing the staff if NEI plans to expand the scope of NEI 10-01 to include developing a generic PPE table and address the other requests for additional information.

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REQUEST FOR ADDITIONAL INFORMATION, RELATED TO
NEI 10-01, INDUSTRY GUIDELINE FOR DEVELOPING A PLANT PARAMETER ENVELOPE
IN SUPPORT OF AN EARLY SITE PERMIT, REVISION 0

General Comment

Comment G-1 Generic Plant Parameter Envelope (PPE) Table

Provide a generic PPE table listing the typical parameters that would serve as surrogate for a reactor design. The values of the parameters should not be included in NEI 10-01. In preparing a generic PPE, be mindful of the PPE definition provided in RS-002 that a PPE is a set of values of plant design parameters that an ESP applicant expects will bound the design characteristics of a reactor or reactors that might be constructed at a given site; i.e., it is intended to serve as a surrogate for actual reactor design information. The types of parameters included in the Vendor Information Worksheet (Appendix B to NEI 10-01) include design parameters (i.e., reactor parameters and owner engineered parameters) and site parameters. The generic PPE table should not contain site parameters, as site parameters are the postulated physical, environmental, and demographic features of an assumed site that are specified in a standard design approval or standard design certification per 10 CFR 52.1(a). An applicant may want to compile a set of bounding site parameters for comparison with its site characteristics for its own use in identifying potential combined license (COL) application departures and exemptions from the standard design, but such information should not be included in the ESP application. The comparison of site characteristics and site parameters is performed in the COL application per 10 CFR 52.79.

If more than one ESP unit is proposed for the site, then the applicant should identify whether all units are the same thermal power level. The “units” in the ESP should not be confused with the actual reactor design selected for the COL application. Multiple actual reactor designs could fit within the thermal power level specified for one ESP unit. The first three ESPs, which used the PPE approach, and especially the North Anna ESP, which was referenced in a combined license application, is a good source for developing the PPE.

Comment G-2 Background, Purpose and Scope, and Appendix A Sections

The text should elaborate on the regulatory basis driving this part of the ESP process and fully introduce the PPE concept. The text should invoke the requirements of Part 52.17(a) in describing the site on which the proposed plant and facilities will be located; and why the PPE concept is used and applied on sites while recognizing that there will be differences among ESP applicants because of site characteristics and the types of reactor technologies being considered. Part of the discussion should refer to Review Standard (RS-002) "Guidance for Processing Applications for Early Site Permits" and SECY-03-0227 as the Commission’s approval for its use in reviewing ESP applications.

Meteorological Comments

Comment M-1 Appendix B, Vendor Information Worksheet, Possible New Items Under PPE Section 9.4 (Release Point)

Comparable to Item 9.4.1, which applies to accidental atmospheric releases, consider whether a new item should be established regarding release point configuration(s) that apply to routine airborne radiological releases – that is, Elevated, Ground-level, or Mixed Mode. Also, consider whether the number of routine release points should be specified.

Regarding Item 9.4.6 (Volumetric Flow Rate), consider clarifying this item by adding design parameters related to the volumetric flow rate that may be used as input to atmospheric dispersion modeling – that is, exit velocity and inside stack or vent diameter or dimensions, orientation of release, and vent heat emission rate.

Consider whether any characteristics associated with intermittent or purge releases, if applicable, should be specified as a design parameter (e.g., number of release points, annual number of releases, average duration of releases).

The following comments concern meteorological site parameters that are listed in the Vendor Information Worksheet. Site parameters do not belong in the PPE table. However, if you decide to provide guidance to the industry on site parameters, then the following comments should be addressed.

Comment M-2, Item 1.2.2 (Snow Load and Ice Load)

Recommend making the following clarifications and additions consistent with DC/COL ISG-07 (Assessment of Normal and Extreme Winter Precipitation Loads on the Roofs of Seismic Category I Structures):

- Clarify 100-year return interval snow load by changing the phrase “snow load” to read “ground snow load”.
- Add 48-hour Probable Maximum Winter Precipitation (PMWP) as a related site parameter and/or corresponding site characteristic..
- Make a distinction between how these site parameters and/or corresponding site characteristics contribute to determining “normal winter precipitation loads” and “extreme winter precipitation loads” – the former including the weight of the 100-year return period ground snow load, the latter including the sum of the weights for the 100-year return period ground snow load and the 48-hour PMWP (refer to NUREG 0800,Standard Review Plan (SRP) Section 2.3.1 and DC/COL ISG-07 for caveats regarding the 48-hour PMWP)
- Refer to DC/COL ISG-07 for data bases to be used in determining the respective site parameter and/or corresponding site characteristic values.

Comment M-3, Item 1.6 (Tornado (Design Bases))

Items 1.6.1 through 1.6.4, and Item 1.6.6 correspond to the design basis tornado (DBT) characteristics in Revision 1 of Regulatory Guide 1.76, “Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants.” Suggest that the portion of the guidance dealing with the

development of these site parameters and/or corresponding site characteristics make reference to the "current versions" of the Regulatory Guide and corresponding technical basis document.

Comment M-4, Item 1.7.1 (3-Second Gust)

Consider updating the industry standard cited in the definition for this site parameter and/or corresponding site characteristic (i.e., SEI/ASCE 7-98). Note that this design standard was subsequently updated in both 2002 and 2005; the latter being designated among the acceptance criteria (as Reference 10) in Revision 3 to SRP Section 2.3.1 of NUREG-0800, "Standard Review Plan." Note also that this standard was revised and issued again in 2010 as ASCE/SEI 7-10. More importantly, however, these revisions incorporate changes to the methodology in determining, and map-presentation of, the basic wind speeds, and the use of Wind Load and Importance Factors. The staff is currently evaluating these differences.

Consider clarifying the title for PPE Section 1.7 to read "Wind (Non-Tornado)" to distinguish this wind-related information from the tornado-related information addressed under Item 1.6.

Comment M-5, Item 1.7.2 (Importance Factors)

See the preceding comment for Item 1.7.1 and refer to ASCE/SEI 7-10 for the applicable revisions to that document regarding the incorporation of Importance Factors in the information presented in the latest revision to that industry standard.

Comment M-6, Item 2.1.1 (Norm Max Ambient Temperature (1% Exceed))

This comment, along with the five following comments, concern the ambient air temperature site parameter values discussed in SRP Sections 2.0 and 2.3.1.

Recommend making the following clarifications and additions:

- To avoid confusion, consider replacing the term "Norm" with a term such as "Operational" or other appropriate descriptor. The term "Normal" when used with respect to climatological data refers to a 30-year average value. This is inconsistent with the statistic being called for (i.e., a 1 percent exceedance value). It could also be interpreted to imply the acceptability of using a 30-year data set to develop that statistical value whereas the longest period of record (POR) of readily available, representative data is expected to be used. However, if retained, suggest clearly stating the term "Norm" as "Normal".
- Under the PPE Section title, suggest clearly stating the term "Exceed" as "Exceedance". Also, to avoid confusion, because the maximum and minimum ambient dry-bulb temperatures are both referred to as 1 percent exceedance values, clarify that the dry-bulb temperatures are expected to be greater than the maximum value only 1 percent of the time.
- Also under the PPE Section title, consider clarifying the phrase "Ambient Temperature" to read "Ambient Dry-Bulb Temperature".
- Specify whether the percent exceedance value represents a frequency of occurrence on a seasonal or annual basis. If the former, identify the applicable months and whether there is any expected variation in duration or months to be included as a result of the proposed site location. Identify any inconsistencies between the time basis for the frequency of

occurrence and the data summaries (e.g., ASHRAE, NCDC) or hourly data sets from which design or site parameter and corresponding site characteristic values are to be developed.

- Explain whether any persistence and/or data filtering is to be presumed in developing the 1 percent exceedance maximum dry-bulb value from a representative sequential, hourly meteorological data set, and consider providing guidance as to how representativeness is to be demonstrated.
- Consider providing an example list of structures, systems, and components for which a 1 percent exceedance maximum value may typically apply.

Comment M-7, Item 2.1.2 (Norm Max Wet Bulb Temperature (1% Exceed))

Recommend making the following clarifications and additions:

- See all recommendations under Item 2.1.1 (except third bullet).
- Explain the relationship(s) between the phrase "used in design of plant safety and non-safety systems" and the parenthetical phrase "(coincident and non-coincident)".
- Consider dividing the "coincident" and "non-coincident" 1 percent exceedance wet-bulb temperatures into separate entries. Clarify how a wet-bulb temperature value presumably coincident with a dry-bulb temperature represents a 1 percent exceedance statistic in and of itself, or if the coincident value actually represents the wet-bulb temperature coincident with the 1 percent exceedance maximum dry-bulb temperature. If the 1 percent exceedance maximum dry-bulb temperature is always associated with a coincident wet-bulb value, consider pairing the dry- and "coincident" wet-bulb temperatures together under the same heading. If not the case, then clearly distinguish when the 1 percent exceedance maximum dry-bulb temperature is to be paired with a "coincident" wet-bulb temperature value and when they are not to be paired.
- Explain how the "coincident" wet-bulb temperature component of the dry- and wet-bulb temperature pair is to be developed, for example - whether it is, in fact, a discrete value coincident with the 1 percent exceedance maximum dry-bulb temperature, whether it represents a mean coincident wet-bulb temperature value, and/or whether or not any persistence and/or filtering of the sequential hourly wet-bulb temperature data is to be presumed.
- Clearly state the basis for understanding the term "non-coincident" wet-bulb temperature, how that site parameter and/or corresponding site characteristic value is to be developed, and how it relates to the descriptor as a 1 percent exceedance value.
- Confirm and clearly state whether the term "non-coincident" wet-bulb temperature, regardless of the percent exceedance level, implies that that limit is to be met regardless of the dry-bulb temperature. If not the case, then explain what limitations apply to the coincident dry-bulb temperature component.
- Based on the preceding comment, confirm whether any of the design temperature components are (should be) represented as a wet-bulb temperature and coincident dry-bulb temperature. If so, take the preceding bulleted items into consideration in explaining how such temperature pairs are to be developed. Also, identify the structures, systems, and components that would utilize these values in their design and operation.
- Explain the basis for demonstrating whether the 1 percent exceedance dry- and coincident wet-bulb temperature site parameter pair bounds the corresponding site characteristic temperature pair - for example, individual site characteristic temperatures

less than their counterparts, or the site characteristic wet-bulb depression (i.e., the difference between the dry- and wet-bulb temperatures) greater or less than the site parameter wet-bulb depression. Clarify whether the demonstration criterion differs depending on the structure, system, or component being considered.

Comment M-8, Item 2.1.3 (Normal Min Ambient Temperature (1% Exceed))

Recommend making the following clarifications and additions:

- To avoid confusion, consider replacing the term “Normal” with a term such as “Operational” or other appropriate descriptor. The term “Normal” when used with respect to climatological data refers to a 30-year average value which is inconsistent with the statistic being called for (i.e., a 1 percent exceedance value). It could also be interpreted to imply the acceptability of using a 30-year data set to develop that statistical value whereas the longest POR of readily available, representative data is expected to be used.
- Under the PPE Section title, suggest clearly stating the term “Exceed” as ”Exceedance”. Also, to avoid confusion, because the maximum and minimum ambient dry-bulb temperatures are both referred to as 1 percent exceedance values, clarify that this dry-bulb temperature is expected to be lower than the minimum value only 1 percent of the time.
- Also under the PPE Section title, consider clarifying the phrase “Ambient Temperature” to read “Ambient Dry-Bulb Temperature”.
- Specify whether the percent exceedance value represents a frequency of occurrence on a seasonal or annual basis. If the former, identify the applicable months and whether there is any expected variation in duration or months to be included as a result of the proposed site location. Identify any inconsistencies between the time basis for the frequency of occurrence and the data summaries (e.g., ASHRAE, NCDC) or hourly data sets from which site parameter and/or corresponding site characteristic values are to be developed.
- Explain whether any persistence and/or data filtering is to be presumed in developing the 1 percent exceedance minimum dry-bulb value from a representative sequential, hourly meteorological data set, and consider providing guidance as to how representativeness is to be demonstrated.
- Developing maximum dry- and/or wet-bulb temperatures is generally constrained by the availability of nearby representative observing stations that concurrently measure both weather elements, typically limited to first-order National Weather Service (NWS) stations, military installations, and in some cases other government and educational institutions. On the other hand, observing station coverage that allows the development of minimum design- and operating-basis temperatures is, for the most part, greater (in both areal extent and duration) because only one weather element is involved. The data from such stations should be taken into consideration as it may be more representative of conditions expected to occur at the proposed site than measurements from the same station used to develop the maximum dry- and/or wet-bulb temperatures. Therefore, consider providing guidance in that regard.
- Consider providing an example list of structures, systems, and components for which a 1 percent exceedance minimum temperature value may typically apply.

Comment M-9, Item 2.1.4 (RX Thermal Power Max Ambient Temperature (0% Exceed))

Recommend making the following clarifications and additions:

- Under the PPE Section title, suggest clearly stating the term “Exceed” as ”Exceedance”, and consider clarifying the phrase “Ambient Temperature” to read “Ambient Dry-Bulb Temperature”.
- Specify whether the exceedance value represents a frequency of occurrence on a seasonal or annual basis. If the former, identify the applicable months and whether there is any expected variation in duration or months to be included as a result of the proposed site location. Identify any inconsistencies between the time basis for the frequency of occurrence and the data summaries (e.g., ASHRAE, NCDC) or hourly meteorological data sets from which site parameter and/or corresponding site characteristic values are to be developed.
- Confirm that the phrase ”historic maximum recorded ambient temperature” (or 0 percent exceedance maximum value) actually means the highest dry-bulb temperature measured at the observing station used to develop this statistical value, regardless of time of year, or specify whether any persistence and/or data filtering is to be presumed. Provide guidance on the determination of this value and how representativeness of the data from the selected observing station is to be demonstrated.
- Suggest expanding this site parameter and/or corresponding site characteristic to include the determination of the maximum ambient dry-bulb temperature associated with a 100-year return period. The long-term representativeness of an historic maximum recorded ambient temperature is constrained by the POR of data available from the observing station used to determine this statistic. The available POR typically varies from station to station. The NRC staff considers an approach that designates the higher of the historic maximum dry-bulb temperature or the 100-year return period value as the maximum safety-related design temperature to be consistent with the intent of 10 CFR 52.79(a)(1)(iii) to provide sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. Provide guidance on the determination of the 100-year return period maximum dry-bulb temperature value.
- Given the preceding comment, revise the title of this site parameter and/or corresponding site characteristic accordingly.
- Consider providing an example list of structures, systems, and components for which a 0 percent exceedance maximum value may typically apply.

Comment M-10, Item 2.1.5 (Rx Thermal Power Max Wet Bulb Temperature (0% Exceed))

Recommend making the following clarifications and additions:

- Under the PPE Section title, suggest clearly stating the term “Exceed” as ”Exceedance”.
- Explain the relationship(s) between the phrase “used in design of plant systems that must be capable of supporting full reactor power operation” and the parenthetical phrase “(coincident and non-coincident)”. Also, clarify whether the phrase “under the assumed temperature condition” refers to the dry- or the wet-bulb temperature. If the latter, explain whether the coincident, non-coincident, or both wet-bulb temperatures are being referred to and why.

- Specify whether the 0 percent exceedance value represents a frequency of occurrence on a seasonal or annual basis. If the former, identify the applicable months and whether there is any expected variation in duration or months to be included as a result of the proposed site location. Identify any inconsistencies between the time basis for the frequency of occurrence and the data summaries (e.g., ASHRAE, NCDC) or hourly data sets from which site parameter and/or corresponding site characteristic values are to be developed.
- Confirm that the phrase ”historic maximum recorded wet bulb temperature” (or 0 percent exceedance maximum value) actually means the highest wet-bulb temperature measured at the observing station used to develop this statistical value, regardless of time of year. Provide guidance on how representativeness of the data from the selected observing station is to be demonstrated.
- Consider dividing the “coincident” and “non-coincident” 0 percent exceedance wet-bulb temperatures into separate entries. Clarify how a wet-bulb temperature value presumably coincident with a dry-bulb temperature represents a 0 percent exceedance statistic in and of itself, or if the coincident value actually represents the wet-bulb temperature coincident with the 0 percent exceedance maximum dry-bulb temperature. If the 0 percent exceedance maximum dry-bulb temperature is always associated with a coincident wet-bulb value, consider pairing the dry- and “coincident” wet-bulb temperatures together under the same heading. If not the case, then clearly distinguish when the 0 percent exceedance maximum dry-bulb temperature is to be paired with a “coincident” wet-bulb temperature value and when they are not to be paired.
- Explain how the “coincident” wet-bulb temperature component of the dry- and wet-bulb temperature pair is to be developed, for example - whether it is, in fact, a discrete value coincident with the 0 percent exceedance maximum dry-bulb temperature, whether it represents a mean coincident wet-bulb temperature value, and/or whether or not any persistence and/or filtering of the sequential hourly wet-bulb temperature data is to be presumed.
- Suggest expanding the “non-coincident” wet-bulb temperature site parameter and/or site characteristic to include the determination of the maximum wet-bulb temperature associated with a 100-year return period. The long-term representativeness of an historic maximum recorded wet-bulb temperature is constrained by the POR of data available from the observing station used to determine this statistic. The available POR typically varies from station to station. The NRC staff considers an approach that designates the higher of the historic maximum wet-bulb temperature or the 100-year return period value as the maximum safety-related design non-coincident wet-bulb temperature to be consistent with the intent of 10 CFR 52.79(a)(1)(iii) to provide sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. Provide guidance on the determination of the 100-year return period maximum wet-bulb temperature value.
- Given the preceding comment, revise the title of this site parameter and/or corresponding site characteristic accordingly
- Clearly state the basis for understanding the term “non-coincident” wet-bulb temperature, how that site parameter and/or corresponding site characteristic is to be developed, and how it relates to the descriptor as a 0 percent exceedance maximum value.
- Confirm and clearly state whether the term “non-coincident” wet-bulb temperature, regardless of the percent exceedance level, implies that that limit is to be met regardless of the dry-bulb temperature. If not the case, then explain what limitations apply to the coincident dry-bulb temperature component.

- Based on the preceding comments, confirm whether any of the design temperature components are (should be) represented as a wet-bulb temperature and coincident dry-bulb temperature. If so, take the preceding bulleted items into consideration in explaining how such temperature pairs are to be developed. Also, identify the structures, systems, and components that would utilize these values in their design and operation.
- Explain the basis for demonstrating whether the 0 percent exceedance dry- and coincident wet-bulb temperature site parameter pair bounds the corresponding site characteristic temperature pair - for example, individual site characteristic temperatures less than their counterparts, or the site characteristic wet-bulb depression (i.e., the difference between the dry- and wet-bulb temperatures) greater or less than the site parameter wet-bulb depression. Clarify whether the demonstration criterion differs depending on the structure, system, or component being considered

Comment M-11, Item 2.1.6 (Rx Thermal Power Min Ambient Temperature (0% Exceed))

Recommend making the following clarifications and additions:

- See recommendations under Item 2.1.3 (third, fourth, and sixth bullets).
- Under the PPE Section title, suggest clearly stating the term “Exceed” as ”Exceedance”.
- Confirm that the phrase ”historic minimum recorded ambient temperature” (or 0 percent exceedance minimum value) actually means the lowest dry-bulb temperature measured at the observing station used to develop this statistical value, regardless of time of year, or specify whether any persistence and/or data filtering is to be presumed. Provide guidance on the determination of this value and how representativeness of the data from the selected observing station is to be demonstrated.
- Suggest expanding this site parameter and/or corresponding site characteristic to include the determination of the minimum ambient dry-bulb temperature associated with a 100-year return period. The long-term representativeness of an historic minimum recorded ambient temperature is constrained by the POR of data available from the observing station used to determine this statistic. The available POR typically varies from station to station. The NRC staff considers an approach that designates the lower of the historic minimum dry-bulb temperature or the 100-year return period value as the minimum safety-related design temperature to be consistent with the intent of 10 CFR 52.79(a)(1)(iii) to provide sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. Provide guidance on the determination of the 100-year return period minimum dry-bulb temperature value.
- Given the preceding comment, the title of this site parameter and/or corresponding site characteristic should be revised accordingly.
- Consider providing an example list of structures, systems, and components for which a 0 percent exceedance minimum ambient temperature value may typically apply.

Comment M-12, Item 9.1 (Atmospheric Dispersion X/Q - Accident)

This comment concerns the short-term atmospheric dispersion site parameter values discussed in SRP Sections 2.0 and 2.3.4.

The need for 0-2 hour (EAB), 0-8 hour (LPZ), 8-24 hour (LPZ), 1-4 day (LPZ), and 4-30 day (LPZ) atmospheric dispersion factors (X/Qs) is indicated in Items 9.1.1 through 9.1.5, respectively.

Both the Site Safety Analysis Report (SSAR) and the Environmental Report (ER) are identified as being applicable. However, under the Definition column for these items there is no distinction between the X/Q values used for each purpose, referring only to "the design safety analysis". Fifth percentile X/Qs are associated with the design-basis accident safety analysis; 50th percentile (realistic accident) X/Qs are associated with the environmental analysis. Clarify these items by making the corresponding distinctions in each definition or establish separate ER-related items.

Regarding Item 9.1.6 (Atmospheric Dispersion X/Q – Severe Accident), the applicability of such a site parameter to the SSAR or ER is not indicated. The staff is not aware of a site parameter X/Q value associated with the severe accident analysis. Clarify how this item is intended to be used, its relationship (if any) to the ER-related X/Qs referred to in the preceding comment, and the time period(s) associated with this item.

Geologic Comments

This comment concerns geologic site parameter values discussed in SRP Section 2.5.4 Rev 4.

Comment G-1 Bearing Capacities (1.5.2 and 1.5.6 in Vendor Information Worksheet)

Bearing capacity cannot be calculated without knowing the geometry of the reactor foundation. This information is design specific and cannot be bounded by a PPE value. The experience from the first three ESPs which used the PPE approach demonstrated the impracticality of attempting to separate bearing capacity of the soil from the design. In the first three ESPs, the staff made the bearing capacity calculation a COL Action Item and clearly indicated that the COL applicant should provide analysis of the stability of all planned safety-related facilities, including bearing capacity.

Comment G-2 Peak Ground Motion (1.3.2)

This parameter is redundant with design response spectrum (peak ground motion is only one point on the entire spectrum) and should not be included as a PPE parameter.

Comment G-3 Time History (1.3.3)

Time history of ground motion for a particular reactor design applied during the seismic analysis of the corresponding structures and components is not reviewed during the ESP application process.

Radiological Comments

Comment R-1 Section 3 - General Process Description and Guidance

The template should identify regulatory issues that are important to site-specific issues and siting criteria but are amenable to the PPE concept and process described in RS-002. The NRC is concerned about operational issues and design features that could result in the contamination of the environment and result in unmonitored and uncontrolled releases. For example, leakage from corroded pipes and tank and component failures resulting in small but protracted leaks or sudden releases of large volumes of contaminated water into the environment. As a result,

Section 3 of the template should acknowledge that some issues can only be resolved when both site characteristics (site surface and ground water hydrology) and engineered design features (leak mitigation design features) are integrated and that such considerations are the responsibility of the vendor and the applicant for a COL. The ESP guidance should acknowledge such considerations and identify all applicable regulatory drivers (e.g., Part 20.1406) and NRC and industry guidance (e.g., RG 4.21, I&E Bulletin 80-10, NEI 08-08A, etc.) and propose COL action items for issues that will addressed by the COL applicant.

A new subsection should be added to Sections 3.2 or 3.3 that address the need for long-term storage of low level radioactive waste (LLRW) if there is no outlet for the disposal of Class B and C wastes under Part 61 at the time of the application. The discussion should address whether the applicant has considered the LLRW storage capacities included as part of the PPE (within the boundary of the Radioactive Waste-Building) and need for constructing a separate onsite LLWR building to store wastes over the long-term. Section 11 of Appendix B should be modified to include such an option and provision.

Comment R-2 Section 4 – Development of Normal and Accident Source Terms for a PPE-Based ESP

The discussions should identify that some elements of RS-002 are incomplete and how they should be addressed in the template. For example, while the scope of the review identifies liquid and gaseous effluents and associated doses to members of the public (See Attach. 3 to RS-002), Chapters 11.2 and 11.3 of the SRP/SSAR are not included as part of the review criteria. The template should identify this and include SRP/SSAR Sections 11.2 and 11.3 in its discussion and in SSAR/PPE worksheet (App. B of the template) as place holders on effluent source terms and offsite doses. Note that as part of this proposed revision, there is a need to correct Footnote 1 to Table 3, p.B-13, which identifies PPE Section 11.2.2.

For gaseous effluent releases, the discussion on atmospheric dispersion and deposition parameters should recognize that in some instances releases will occur from multiple discharge points (e.g., ESBWR: Reactor-Bldg, Turbine-Bldg, and Radioactive Waste-Bldg) versus a single discharge stack (e.g., U.S. EPR). In such instances, the discussion should note whether there is a need to consider three sets of values (X/Q and D/Q) and radioactive source terms for each stack or derive a single effective set of dispersion and deposition parameters that encompass all release points and applied to the sum of individual source terms. Sections 9.2, 9.3, 9.4, and 9.5 of Appendix B should be modified to accommodate such situations.

For liquid effluents, the discussion should note that for purpose of the ESP analysis, the discharge path takes into consideration site specific characteristics beyond the physical boundary of the nuclear island. The definition and description should start at the boundary of the LWMS or RWB to the point of controlled discharges to the environment, as defined by site conditions or based on an existing offsite dose calculation manual for new plants collocated with operating plants. The definition should be clear enough to address liquid effluents produced during normal operation and anticipated operational occurrences as planned discharges. In characterizing the full discharge path, the discussions should identify all in-plant blow-down flow rates that make up the overall in-plant dilution factor before discharges are released in uncontrolled areas. All other types of liquid effluent discharges would be considered as accidental releases and as unmonitored and uncontrolled releases and addressed in the context of SRP Section 2.4.13 and SRP 11.2 and Branch Technical Position (BTP) 11-6 in the SSAR.

The discussion should recognize and address that in some situations, the exposure pathways and dose receptors identified in the SSAR/PPE and evaluated in the ER may in fact change at the time that the COL application is prepared. Such changes would be identified during the conduct of yearly land-use census at sites with collocated operating power plants or as part of the environmental monitoring program implemented at green field sites. As a result, the SSAR should identify an appropriate set of permit conditions to identify and address exposure pathways and dose receptors not identified in the SSAR. For example, the permit condition would state that exposures associated with crop and pasture irrigation were not considered because lake water is not used for this purpose. However, should local land-use information reveal that the use of lake water becomes significant in irrigating crops and pasture; the COL applicant should consider this pathway in the application and confirm that the associated doses are in compliance with Part 50, Appendix I criteria. A similar set of conditional permit requirements should be identified for exposures associated with airborne releases and flag that for pathways not considered in the SSAR, the COL applicant would need to provide the appropriate set of atmospheric dispersion and deposition parameters. The parameters include annual average undepleted/no decay X/Q values; annual average undepleted/2.26-day decay X/Q values; annual average depleted/8.00-day decay X/Q values; and the annual average D/Q values for all newly identified exposure pathways and locations.

The template should also note that the information included in the SSAR/ER should include sufficient information for the NRC staff to conduct independent analyses in confirming compliance with the requirements of Part 20, Appendix B, Table 2 ECLs and Part 50, Appendix I design objectives. The supporting information should be justified with sufficient details or supported by appropriate references.

1. Appendix B Vendor Information Worksheet

    a. Main PPE Table (table not numbered) - Address and incorporate comments noted above in respective sections of the PPE table.

    b. Table 3 – Principal radionuclides in solid wastes

The total activity cutoff of $<10^{-2}$ curies per year is too coarse of reporting threshold for some types of LLRW. It is suggested that the threshold be lowered to at least $<10^{-3}$ curies per year.

Given the current scrutiny on disposal outlets for Class A, B, and C LLRW and feasibility of building onsite LLRW storage facilities or using commercial services, it is recommended that Table 3 also provides an estimate of the expected LLRW volume distributions as Class A, B, and C wastes, given the requirements of Part 61.55 and 61.56. The considerations for possibly building an onsite LLRW storage facility should be identified in Sections 3.3 and 3.4 of the Template, and in Appendix B PPE table, Section 11 (Solid radwaste system), and Section 15.2.4 (Power block). Also, it is recommended that Table 3 provides an estimate of the expected volumes of mixed wastes, i.e., those that are characterized by the presence of hazardous materials comingled with plant-derived radioactivity.

The reported quantities should be reported in both conventional and SI units.

c. Table 7 – Average annual normal gaseous release

Table 7 should include provisions for indicating the type of plant forming the basis of the PPE values for SSARs that consider two or more reactor designs; note that yearly gaseous release rates is for all effluent release points for plant designs that have multiple release points (e.g., R-Bldg, T-Bldg, and RW-Bldg); and state whether tabulated releases are based on each design's certification or were adjusted upward for designs whose certifications were not final and approved by the NRC at the time of SSAR/PPE preparation.

For gaseous effluents, Br-84, Rb-88, and Ce-143 should be added to the listing based on a comparison with ANSI/ANS 18.1-1999.

The table title should be changed to "Average annual normal gaseous radioactive releases

The reported quantities should be reported in both conventional and SI units.

d. Table 10 – Average annual normal liquid radioactive releases

Table 10 should include provisions for indicating the type of plant forming the basis of the PPE values for SSARs that consider two or more reactor designs; and state whether tabulated releases are based on each design's certification or were adjusted upward for designs whose certifications are not final and approved by the NRC at the time of SSAR/PPE preparation.

For liquid effluents, Br-84, Rb-88, Tc-99, I-129, and Ce-143 should be added to the listing given the upcoming NRC position described in Attachment A of ISG-13 to SRP Section 11.2 and BTP 11-6 (draft version at this time) and a comparison with ANSI/ANS 18.1-1999.

The reported quantities should be reported in both conventional and SI units.

Accident Comments

Comment A-1 Section 4 – Development of Normal and Accident Source Terms for a PPE-Based ESP

On page 18, the text indicates that the applicant can completely defer the accident dose calculation until the COL application stage. However, the dose calculation at EAB and LPZ cannot be deferred and is required by 10 CFR 52.17(a)(1)(ix) at the ESP stage. The control room dose calculation is not required by 10 CFR 52.17 for ESPs because the dose to the control room is influenced by the structural orientation.

Comment A-2, Section 4 – Development of Normal and Accident Source Terms for a PPE-Based ESP, Accident Releases

More information could be given in this section to guide applicants developing PPE accident source terms. For example, more information could be given on how to choose the analyses that will be the basis for showing compliance with 52.17(a)(1), if that is how the accident source terms will be presented in the PPE.

Discussion of review of PPE accident source terms is given in Attachment 2 of RS-002, starting on page 15.0-1. Additional discussion of PPE accident source terms is given in letters to NEI on ESP topic 7, dated February 5, 2003 (ML030210341), "Resolution of Early Site Permit Topic 7 (ESP-7), Guidance for Satisfying 10 CFR 52.17(a)(1) Requirements," and June 20, 2003 (ML031150617), "Response to Letter on Early Site Permit Topic 7 (ESP-7), Guidance for Satisfying 10 CFR 52.17(a)(1) Requirements."

Comment A-3, Section 4 – Development of Normal and Accident Source Terms for a PPE-Based ESP, Accident Releases

Additional guidance on development and presentation of severe accident release source terms for use in the environmental report could be given in this section, or (if applicable) a discussion of why it would not be included in a PPE, even though analysis is provided in ESP environmental report. Consider an addition to the Vendor Information Worksheet for a section on severe accident release source terms, including tables much like those for the accident gaseous releases.

Comment A-4, Appendix A, Section A.4 – Regulatory Bases

On page A-3, the last bullet under the regulatory bases for emergency planning identifies RG 1.183 (guidance on light water reactor (LWR) design basis accident (DBA) dose analysis) as a basis. This is not completely correct, in that the DBAs are not the only accident analyses to be used in the development of the emergency plans. For example, severe accident guidance is not called out separately like the DBA guidance is. RG 1.183 should be moved to the list of regulatory bases for the SSAR.

Environmental comments

Comment E-1

The PPE serves as a surrogate for the reactor design. The parameters need to be sufficiently detailed so that the staff can evaluate the environmental impact of this surrogate reactor on the environment. Appendix D of the first three ESP (Clinton, Grand Gulf and North Anna) contains the PPEs used in the environmental review. The PPEs in these first three ESPs are a good reference point for developing a PPE for use in the environmental review.

Security

Comment S-1

The guidance needs to specify that 10 CFR 52.17(a)(1)(x) requires that an application contain information demonstrating that site characteristics are such that adequate security plans and measures can be developed. Update Figure A.2 and the corresponding guidance to reflect the requirements of 10 CFR 52.17(a)(1)(x); and 10 CFR 100.21(f).

Comment S-2

Add references to 10 CFR 52.17(a)(1)(xii) and NUREG-0800, Standard Review Plan, Section 13.6.3 Physical Security – Early Site Permit.

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