Progress Energy

Serial: NPD-NRC-2013-011
April 26, 2013

10CFR52.79

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

LEVY NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 52-029 AND 52-030
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 112 RELATED TO RADIOACTIVE WASTE MANAGEMENT

Reference: Letter from Jerry Hale (NRC) to Christopher M. Fallon (PEF), dated March 11, 2013, "Request for Additional Information Letter No. 112 Related to SRP Section 11.2 for the Levy County Nuclear Plant, Units 1 and 2 Combined License Application"

Ladies and Gentlemen:

Progress Energy Florida, Inc. (PEF) hereby submits our response to the Nuclear Regulatory Commission's (NRC) request for additional information provided in the referenced letter.

A response to the NRC request is addressed in the enclosure. The enclosure also identifies changes that will be made in a future revision of the Levy Nuclear Plant Units 1 and 2 application.

If you have any further questions, or need additional information, please contact Bob Kitchen at (704) 382-4046, or me at (704) 382-9248.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 26, 2013.

Sincerely,

Christopher M. Fallon

Christopher M. Fallon
Vice President
Nuclear Development

Enclosure/Attachment

cc : U.S. NRC Region II, Regional Administrator
Mr. Donald Habib, U.S. NRC Project Manager
Mr. Jerry Hale, U.S. NRC Project Manager

Progress Energy Florida, Inc.
P.O. Box 14042
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Levy Nuclear Plant Units 1 and 2
Response to NRC Request for Additional Information Letter No. 112 Related to SRP Section 11.2 for the Combined License Application, dated March 11, 2013

NRC RAI #	Progress Energy RAI #	Progress Energy Response
Question 24734-1	L-1028	Response enclosed – see following pages
Question 24734-2	L-1030	Response enclosed – see following pages
Question 24734-3	L-1031	Response enclosed – see following pages
Question 24734-4	L-1032	Response enclosed – see following pages
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NRC Letter No.: LNP-RAI-LTR-112

NRC Letter Date: March 11, 2013

NRC Review of Final Safety Analysis Report

NRC RAI #: Question 24734-1

Text of NRC RAI:

This is a follow up to the applicant's response to Question 11.02-4.

In reviewing the applicant's response to Question 11.02-4, staff has found the response partly responsive to the staff's technical and regulatory concerns based on the AP1000 DCD and endorsement of RG 1.143, Rev. 2. The staff has identified the following issues and requests further clarifications from the applicant. Specifically, the issues and questions are:

1. In Table 1 of the response to Question 11.02-4, the applicant provides a monitoring tank source term based on FSAR Table 2.4.13-202, normalized to the 10 CFR Part 71 A_2 values. The radionuclide concentrations listed in this table are based on a fuel failure rate of 0.125%. This fuel failure rate is used for the purpose of complying with SPR Section 11.2, BTP 11-6, which addresses itself to a postulated event and radiological consequences outside of the scope and purpose of RG 1.143, Rev. 2. However, the maximum expected source term for each SSC should be based on an assumed 0.25% failed fuel fraction, as described in SRP Section 12.2. Therefore, for the purposes of demonstrating conformance with RG 1.143, Rev. 2, please revise the monitoring tank source term to a source term based on an assumed 0.25% failed fuel fraction.

PGN RAI ID #: L-1028

PGN Response to NRC RAI:

In order to base the classification of the RWB on the design basis defective fuel fraction of 0.25%, the A_2 quantity of activity in the monitor tank is calculated from the reactor coolant activity listed in LNP FSAR Table 2.4.13-202. This is the same activity listed in DCD Table 11.1-2 without the noble gas nuclides. Short-lived radionuclides listed in DCD Table 11.1-2 that will decay prior to collection and processing in the RWB and for which nuclide-specific A_2 values are not provided in 10 CFR 71 Appendix A Table A-1 are also not considered in the calculation of RWB source terms. Excluding the short-lived nuclides produces significantly more conservative results.

The monitor tank will contain a mixture of activity, so the A_2 quantity in the tank is determined by using the guidance provided in Section IV(d) of 10 CFR 71 Appendix A:

$$A_2 = \frac{1}{\sum_i \frac{f(i)}{A_2(i)}}$$

where:

A_2 = A_2 quantity for the whole mixture,
$f(i)$ = fraction of activity for nuclide *i* in the mixture,
$A_2(i)$ = appropriate A_2 quantity for radionuclide *i* from 10 CFR 71 Appendix A, Table A-1, and
I = indicates the summation is done for all nuclides in the mixture.

The attached Table 1 summarizes the determination of the activity in a monitor tank. It includes a list of the nuclides in the tank, the corresponding A_2 value from 10 CFR 71, Appendix A, Table A-1, the nuclide concentration in the reactor coolant, and the nuclide inventory in the monitor tank. The final column in Table 1 is the A_2 fraction for each radionuclide in a monitor tank and demonstrates that the sum of A_2 fractions is equal to one. The monitor tank inventory is also the limiting inventory in the mobile radwaste processing equipment since this equipment is only used to process radwaste that results in less than an A_2 quantity of activity on the mobile radwaste processing equipment. See PGN's responses to Question 4 and 5 below for the limit on activity in the mobile equipment.

Associated LNP COL Application Revisions:

None.

Attachments/Enclosures:

Attachment 1: Table 1 – Monitor Tank A_2 Activity Inventory (2 pages)

NRC Letter No.: LNP-RAI-LTR-112

NRC Letter Date: March 11, 2013

NRC Review of Final Safety Analysis Report

NRC RAI #: Question 24734-2

Text of NRC RAI:

This is a follow up to the applicant's response to Question 11.02-4.

In reviewing the applicant's response to Question 11.02-4, staff has found the response partly responsive to the staff's technical and regulatory concerns based on the AP1000 DCD and endorsement of RG 1.143, Rev. 2. The staff has identified the following issues and requests further clarifications from the applicant. Specifically, the issues and questions are:

2. In the response to Question 11.02-04, the applicant assumed that all of the radioactivity inventory in the mobile liquid radwaste processing equipment is contained within the demineralizer, with a volume of 1.42 m^3. However, the response does not provide a source term for the balance of the other components that are part of a typical mobile liquid waste processing system. In addition, it is unclear whether the total activity contained within all of the filters, resins, and charcoal contained within the mobile system is being considered. Finally, in demonstrating conformance with RG 1.143, Rev. 2 dose and acceptance criteria, the response assumes the operation of a single liquid mobile waste processing unit. However, DCD FSAR Figure 12.3-3 indicates that there could be up to three mobile waste systems operating at the same time in the radwaste building (RWB) and DCD FSAR Section 11.4 indicates that wet waste and solid waste could also be processed in the RWB. Therefore, the applicant is requested to provide the following information:

    a. Provide source term information for all major components of the mobile processing equipment that are expected to be present in the RWB, including the cumulative source term inventories for each type of mobile system (i.e., for liquid wastes, wet-wastes, and solid wastes).

    b. Describe how the source term for each mobile processing unit was derived in ensuring that the cumulative source terms account for the potential activity contained in all major components that make up a typical processing unit. Major components that are expected to contain a majority of the radioactivity include, for example, pre and post-filters, charcoal filters, ion exchange columns, pumps, and resin traps.

    c. Provide the maximum cumulative dose rate for each of the three mobile waste processing systems that are expected to be present at any one time, in evaluating dose results against RG 1.143, Rev. 2, dose and acceptance criteria.

PGN RAI ID #: L-1030

PGN Response to NRC RAI:

Part a.

As described in Section 11.4 of the AP1000 DCD, the use of mobile radwaste processing systems for processing radwaste permits the use of the latest technology and avoids the equipment obsolescence problems experienced with installed radwaste processing equipment. The most appropriate mobile radwaste processing systems will be used in the RWB. Since the systems that may be selected in the future cannot be anticipated in sufficient detail at this time, it is not possible to assign source term inventory fractions to each of the processing components of such systems. However, it is possible to define the total maximum inventory contained in all of the components of such a system and develop a bounding source term model as provided in PGN's response to Part b. below.

As stated in Section 11.2.1.2.5.2 of the LNP FSAR, radioactive waste will not be processed in the RWB if it is anticipated that the radioactive waste contents could exceed the A_2 quantities specified in Appendix A to 10 CFR Part 71. Therefore, the total inventory contained in each mobile radwaste processing system is necessarily limited to the A_2 quantity, which is described in PGN's response to Question 1 above.

Part b.

To develop a source term model of anticipated waste processing units, current systems were evaluated. These systems are expected to be composed of various components (filters, demineralizers, etc.). To conservatively estimate the dose rate from an entire mobile radwaste processing unit, an A_2 quantity of activity is assumed to be consolidated in a single vessel the size and geometry of a demineralizer vessel typically included in such systems (50 ft^3). This is more conservative than assuming multiple vessels since multiple vessels will result in more self shielding and a more dispersed source, which will produce lower dose rates. The use of a single vessel of this size is also bounding for a mobile dewatering system, which is included within the scope of unpackaged waste considered in the RWB classification basis. The dose from the single vessel is multiplied by three to account for the possibility of up to three mobile radwaste processing systems in the RWB.

Part c.

To calculate the dose to a member of the public from a potential unmitigated release of RWB radiological sources, it is assumed that the maximally exposed individual is located at the boundary of the protected area closest to the RWB. The potential RWB sources include a) three (3) monitor tanks each containing the inventory listed in Table 1, and b) up to three (3) mobile radwaste processing systems, each modeled as a demineralizer with a volume of 1.42 m^3 (50 ft^3) and each containing the inventory listed in Table 1.

For LNP, the closest distance to the protected area boundary from the RWB for either Unit 1 or Unit 2 is 122 m (400 ft). It is assumed the liquid from all three monitor tanks is released from the RWB and flows on the ground to the protected area boundary without being absorbed into

the ground. The result is a shallow pool of water located between the RWB and the protected area boundary. A rectangular source (175 feet by 400 feet) approximately 1 inch in depth is used to model the pool and the dose rate calculated at an edge dose point three feet above the surface of the water. The calculated dose rate is 43 mrem/hr.

A similar approach is used to calculate the dose rate to a member of the public from an unmitigated release from the mobile radwaste processing equipment, with the following exception. Essentially all of the activity in the mobile radwaste processing equipment will be attached to the media used to remove radioactive contaminants from the process fluids. Therefore, this radionuclide inventory is not mobile and would not flow out of the RWB. Each mobile radwaste processing system is modeled as a right circular cylinder representative of 1.42 m^3 (50 ft^3) of unshielded demineralizer media. The unmitigated dose rate is calculated at a distance of 122 m (400 ft) from the surface of the demineralizer. The resulting dose rate is 0.166 mrem/hr. The result for a single unit is multiplied by three to account for three mobile radwaste processing systems with the same limiting inventory. The resultant total unmitigated dose rate from three mobile radwaste processing systems at the protected area boundary is 0.498 mrem/hr.

The total dose to a member of the public from an unmitigated release (considering the total maximum inventory of unpackaged waste potentially present in the RWB) is calculated by summing the dose rates from RWB monitor tank and the mobile radwaste processing equipment unmitigated releases and then multiplying the sum by an assumed exposure period of two hours. The resultant total unmitigated dose to a member of the public is 87 mrem.

To calculate the dose to site personnel inside the protected area from an unmitigated exposure to potential RWB sources, it is conservatively assumed that site personnel remain inside the protected area at the location of their activities. The potential sources include a) three (3) monitor tanks each containing the inventory listed in Table 1, and b) up to three (3) mobile radwaste processing systems, each assumed to be a demineralizer with a volume of 1.42 m^3 (50 ft^3) and each containing the inventory listed in Table 1. The average distance between maximum exposed site personnel and RWB sources is conservatively assumed to be 10 feet consistent with the assumed 2-hour period of exposure. Ten feet conservatively bounds the location of the RWB relative to normally occupied areas of the site.

The unmitigated dose to site personnel from exposure to the monitor tanks is determined by first calculating the limiting dose rate from a single monitor tank. Each tank is modeled as a right circular cylinder with a volume of 56,775 L (15,000 gal) and the inventory listed in Table 1. The dose rate from a single tank is calculated at 10 feet from the center of the tank's side surface. The calculated dose rate for a single tank is 49 mrem/hr. This dose rate is assumed to be applicable to each of the three monitor tanks in the RWB.

Each mobile radwaste processing system is modeled as a 1.42 m^3 (50 ft^3) right circular cylinder, and the unmitigated dose rate assuming no shielding is calculated 10 feet from the center of the side surface of the unshielded demineralizer media. The resulting dose rate is 324 mrem/hr. This dose rate is assumed to apply to each of the three mobile radwaste processing systems in the RWB.

The total dose to site personnel from an unmitigated exposure (considering the maximum inventory) is calculated by summing the dose rates from three monitor tanks and three mobile radwaste processing systems, and then multiplying the sum by the assumed two hour exposure period. The resulting site personnel dose is 2238 mrem.

In addition to performing site personnel unmitigated exposure calculations at an assumed distance of 10 feet, supplementary calculations are performed using the same source terms and equal distance assumptions to determine how close site personnel would need to be continuously present over the assumed two hour exposure period before exceeding the 5 rem RWB classification criteria. This distance was calculated to be approximately six feet.

In summary, based on the evaluations presented above and the response to Question 4, the following is demonstrated:

- The total dose to a member of the public located at the protected area boundary resulting from the unmitigated release of the maximum RWB radionuclide inventory considering a two hour exposure period is less than 100 mrem.
- The unmitigated exposure to site personnel within the protected area to the maximum RWB radionuclide inventory over a two hour exposure period is less than 5 rem.
- The amount of activity in each component in the RWB is maintained less than the A_2 quantity from 10 CFR 71 Appendix A (reference response to Question 4).

Therefore, for radwaste systems located in the RWB, the systems, structures and components meet the requirements for a classification of RW-IIc as specified in RG 1.143, Regulatory Position 5.4 and AP1000 DCD Appendix 1A.

Associated LNP COL Application Revisions:

None.

Attachments/Enclosures:

None.

NRC Letter No.: LNP-RAI-LTR-112

NRC Letter Date: March 11, 2013

NRC Review of Final Safety Analysis Report

NRC RAI #: Question 24734-3

Text of NRC RAI:

This is a follow up to the applicant's response to Question 11.02-4.

In reviewing the applicant's response to Question 11.02-4, staff has found the response partly responsive to the staff's technical and regulatory concerns based on the AP1000 DCD and endorsement of RG 1.143, Rev. 2. The staff has identified the following issues and requests further clarifications from the applicant. Specifically, the issues and questions are:

3. DCD FSAR Sections 11.4.2.5.2 and 11.4.1.3 indicate that the accumulation room contains pre-processed waste (including mixed liquid waste). RG 1.143, Rev. 2 indicates that all waste up until the point of packaging should be included in the building inventory in determining unmitigated exposures and doses from an unmitigated release. However, the applicant did not include a source term for pre-processed or unpackaged waste located in the RWB, or include pre-processed or unpackaged waste in its unmitigated dose/exposure calculations. Therefore, the applicant should ensure that all waste, excluding wastes that are packaged and ready for shipment, be included in the RWB unmitigated exposure and dose calculations in order to confirm that the total cumulative inventory of the radioactivity contained in all expected waste forms and quantities does not exceed the dose criteria for the assigned RW-IIc building classification.

PGN RAI ID #: L-1031

PGN Response to NRC RAI:

The accumulation room will contain either packaged wastes that require no further processing, or packaged, but unsorted, low specific activity dry activated waste (LSA DAW) that will periodically be sorted and re-placed in packaging suitable for disposal. Only packaged mixed waste is received and stored in the accumulation room. The quantity of LSA DAW that is being processed at any given time (and thus not in a packaged, ready for shipment form) is limited and the sorting process is a normal activity performed consistent with ALARA work practices. Potential dose rate contributions from unpackaged LSA DAW undergoing sorting in the accumulation room will be limited to less than 0.1 rem/hr consistent with DCD Figure 12.3-1 and are insignificant relative to the Regulatory Guide 1.143, Revision 2, Section 5 building classification criterion for site personnel of 5 rem applied over an assumed event period of two hours.

Unpackaged wastes other than LSA DAW undergoing sorting and packaging that are handled or processed in the RWB are limited to a) Monitor Tank fluids, and b) liquid and wet wastes associated with mobile radwaste processing systems. These potential sources are all addressed in the dose calculations presented in the response to Question 2 above. Transfer and packaging of spent media from a mobile radwaste processing system will be controlled by a process control program as discussed in response to Question 7 and is considered in the evaluation of unmitigated, unshielded dose. The liquid in the Monitor Tanks may also be considered unprocessed waste, which is also considered in the unmitigated release and exposure.

Thus, all significant unpackaged radiological waste sources potentially present at any time in the RWB are considered in the dose calculations presented in response to Question 2 above. The total dose from unmitigated radiological release and exposure of all unpackaged and unprocessed wastes will be maintained less than the Regulatory Guide 1.143, Revision 2, Section 5 building classification criteria assuming a two hour exposure period. Since all other wastes in the Radwaste Building will be packaged and ready for shipment, RG 1.143, Revision 2, Section 5 does not require consideration when determining RWB unmitigated release and exposure.

Associated LNP COL Application Revisions:

None.

Attachments/Enclosures:

None.

NRC Letter No.: LNP-RAI-LTR-112

NRC Letter Date: March 11, 2013

NRC Review of Final Safety Analysis Report

NRC RAI #: Question 24734-4

Text of NRC RAI:

This is a follow up to the applicant's response to Question 11.02-4.

In reviewing the applicant's response to Question 11.02-4, staff has found the response partly responsive to the staff's technical and regulatory concerns based on the AP1000 DCD and endorsement of RG 1.143, Rev. 2. The staff has identified the following issues and requests further clarifications from the applicant. Specifically, the issues and questions are:

4. In response to Question 11.02-4, Question 3, the applicant states that they will maintain the source term of each individual mobile processing unit below the 10 CFR Part 71 A_2 values. However, maintaining the source term of each individual unit below the A_2 values does not ensure that the aggregate value of all relevant sources in the RWB does not exceed the unmitigated dose and acceptance criteria of RG 1.143, Rev. 2. Therefore, the applicant's proposed revision to FSAR Section 13.5.2.2.5 and the proposed license condition provided in the response to Question 11.02-4 are not adequate to ensure that the amount of waste being stored in the building does not exceed that allowed by the assigned building classification. In addition, the proposed revision to FSAR Section 13.5.2.2.5 and the proposed license condition do not consider the radioactive inventories of pre-processed and unpackaged waste expected to be present in the RWB. Therefore, please revise FSAR Section 13.5.2.2.5 and the proposed license condition to account for all pre-processed and unpackaged waste, in addition to that contained in all mobile waste processing units, in order to ensure that the total cumulative source term of the building does not exceed RG 1.143, Rev. 2, dose and acceptance criteria.

PGN RAI ID #: L-1032

PGN Response to NRC RAI:

Duke's programmatic controls will be designed such that the aggregate source term for all relevant sources in the Radwaste Building (RWB) does not exceed the unmitigated dose acceptance criteria of RG 1.143, Revision 2. The RWB operations involving unprocessed and unpackaged waste is limited to liquid waste processing utilizing up to three mobile radwaste processing systems, which includes periodic spent media transfer and packaging and LSA-DAW sorting. The RWB only receives packaged mixed waste. Thus, the RWB classification unmitigated release and exposure evaluation presented in response to Question 2 above has considered all applicable sources of unpackaged waste.

FSAR Section 13.5.2.2.5, "Radioactive Waste Management Procedures" and License Condition 13 in Part 10 are being updated to specify that procedures will ensure that the inventory of unpackaged wastes in the RWB, including all sources associated with the mobile radwaste processing units, is monitored such that the total unmitigated dose will not exceed RG 1.143, Revision 2, building classification criteria.

1. Insert the following text at the end of LNP COLA Part 2, FSAR Section 13.5.2.2.5, "Radioactive Waste Management Procedures":

LNP COL 13.5-1 Operating procedures include provisions to assure that A_2 quantities for radionuclides specified in Appendix A to 10 CFR Part 71 are not exceeded. Procedural controls limit the radionuclide inventory to less than the A_2 limit in each of the three (3) monitor tanks, and in each of up to three (3) mobile radwaste processing systems. Spent media transfer from a mobile radwaste processing systems located in the Radwaste Building is controlled such that spent media transfer and packaging for offsite shipment must be complete prior to placing the associated source mobile radwaste processing system back into service. The procedures ensure that the total cumulative source term of unpackaged waste present at any time in the Radwaste Building is limited consistent with RG 1.143, Revision 2, unmitigated radiological release and exposure acceptance criteria. The liquid radwaste system is discussed in Section 11.2.

STD COL 13.5-1 13.5.2.2.6 Maintenance, Inspection, Surveillance, and Modification Procedures

2. Insert the following text at the end of the Proposed License Conditions in LNP COLA Part 10:

13. RADWASTE BUILDING RADIOACTIVITY LIMITS

PROPOSED LICENSE CONDITION:

Prior to initial fuel load, procedural controls limiting radionuclide inventory in each of the Radwaste Building Monitor Tanks, and separately in each of up to three (3) Radwaste Building mobile radwaste processing systems to below A_2 quantities for radionuclides specified in Appendix A to 10 CFR Part 71 shall be in place, as described in FSAR Section 13.5.2.2.5.

Associated LNP COL Application Revisions:

See changes to FSAR Section 13.5.2.2.5 and COLA Part 10 described above.

Attachments/Enclosures:

None.

NRC Letter No.: LNP-RAI-LTR-112

NRC Letter Date: March 11, 2013

NRC Review of Final Safety Analysis Report

NRC RAI #: Question 24734-5

Text of NRC RAI:

This is a follow up to the applicant's response to Question 11.02-4.

In reviewing the applicant's response to Question 11.02-4, staff has found the response partly responsive to the staff's technical and regulatory concerns based on the AP1000 DCD and endorsement of RG 1.143, Rev. 2. The staff has identified the following issues and requests further clarifications from the applicant. Specifically, the issues and questions are:

5. In the response to Question 11.02-4, the applicant states that transfer of liquid wastes from the effluent tanks to the monitor tanks may occur without treatment. However, the direct transfer of untreated liquid wastes from the effluent tanks to the monitor tanks could result in the contents of the monitor tanks exceeding the 10 CFR Part 71 A_2 values or the resulting unmitigated exposures or doses from an unmitigated release from the RWB exceeding the RG 1.143, Rev. 2, dose and acceptance criteria, given the assigned classification of the RWB. In order not to exceed these safety classification criteria, direct transfer of liquid wastes to the RWB should only be permitted if the 10 CFR Part 71 A_2 values and the applicable dose criteria are not exceeded. Therefore, the applicant should make this distinction clear in describing the operational concept and procedural constraints in ensuring that the total cumulative source term of the RWB does not exceed RG 1.143, Rev. 2 dose and acceptance criteria.

PGN RAI ID #: L-1033

PGN Response to NRC RAI:

The statement in the Question 11.02-04 was only intended to describe the basis for the assumed distribution of radionuclides used in safety classification dose rate calculations. The statement that transfer of liquid wastes from an effluent tank to a Radwaste Building Monitor Tank may occur without treatment was not intended to imply that A_2 controls would not be applied or that A_2 limits would not be met.

The post-transfer A_2 radionuclide inventory for the destination Radwaste Building Monitor Tank and applicable mobile radwaste processing system train will be calculated and compliance with inventory limits will be verified prior to each transfer of a batch of liquid waste to the Radwaste Building. The procedures will ensure Radwaste Building compliance with safety classification criteria specified in Section 5 of Regulatory Guide 1.143, Revision 2. Calculations have been performed as described in the responses to Questions 1 and 2 that demonstrate how procedural

controls to limit radioactivity below A_2 quantities for radionuclides specified in Appendix A to 10 CFR Part 71 in each of the three Radwaste Building Monitor Tanks, and separately in each of up to three mobile radwaste Systems ensure compliance with the applicable dose criteria specified in Section 5 of Regulatory Guide 1.143, Revision 2.

Based on the above discussion, adequate controls will be in place to ensure compliance with RG 1.143, Rev. 2 dose acceptance criteria.

Associated LNP COL Application Revisions:

None.

Attachments/Enclosures:

None.

NRC Letter No.: LNP-RAI-LTR-112

NRC Letter Date: March 11, 2013

NRC Review of Final Safety Analysis Report

NRC RAI #: Question 24734-6

Text of NRC RAI:

This is a follow up to the applicant's response to Question 11.02-4.

In reviewing the applicant's response to Question 11.02-4, staff has found the response partly responsive to the staff's technical and regulatory concerns based on the AP1000 DCD and endorsement of RG 1.143, Rev. 2. The staff has identified the following issues and requests further clarifications from the applicant. Specifically, the issues and questions are:

6. The COL Item in DCD FSAR Section 11.2.5.1 states that, "The Combined License applicant will discuss how any mobile or temporary equipment used for **storing or processing** liquid radwaste conforms to Regulatory Guide 1.143, Rev. 2. For example, this **includes discussion of equipment containing radioactive liquid radwaste** in the **nonseismic Radwaste Building**." Therefore, the FSAR should be updated to fully address this COL item. Specifically, the FSAR should be updated to include information demonstrating that the mobile processing equipment and SSCs for storing preprocessed and unpackaged waste will be in conformance with the assigned classification of the RWB.

PGN RAI ID #: L-1034

PGN Response to NRC RAI:

COL 11.2-1 is being updated to include specifics to ensure that doses from all unpackaged waste, in addition to that contained in all mobile radwaste processing units, are monitored such that the total cumulative source term of the building will not exceed RG 1.143, Rev. 2, dose acceptance criteria. Specifically, FSAR section 11.2.1.2.5.2 is being updated to include information demonstrating that the mobile radwaste processing equipment and structures, systems, and components for storing unpackaged waste will be in conformance with the assigned classification of the RWB.

FSAR Section 11.2.1.2.5.2 (STD COL 11.2-1) will be revised from:

STD COL 11.2-1 When mobile or temporary equipment is selected to process liquid effluents, the equipment design and testing meets the applicable requirements of Regulatory Guide 1.143. When confirmed through sampling that the radioactive waste contents do not exceed the A_2 quantities for radionuclides specified in Appendix A to 10 CFR Part 71, the liquid effluent may be processed with mobile or temporary equipment in the Radwaste Building. When the A2 quantities are exceeded, liquid effluent is processed in the Seismic Category I auxiliary building.

Mobile and temporary equipment are designed in accordance with the applicable mobile and temporary radwaste treatment systems guidance provided in Regulatory Guide 1.143, including the codes and standards listed in Table 1 of the Regulatory Guide.

To read:

LNP COL 11.2-1 When mobile or temporary equipment is selected to process liquid effluents, the equipment design and testing meets the applicable requirements of Regulatory Guide 1.143. When confirmed through sampling that the radioactive waste contents result in an inventory on a mobile system that is below the A_2 quantity limit for radionuclides specified in Appendix A to 10 CFR Part 71, the liquid effluent may be processed with the mobile liquid waste processing system in the Radwaste Building. When pre-process sampling and controls indicate that A_2 quantity limits may be exceeded by processing liquid effluent in the Radwaste Building, liquid waste is processed in the Seismic Category I auxiliary building. The provisions ensure that the total cumulative source term of unpackaged waste present at any time in the Radwaste Building is limited consistent with RG 1.143, Revision 2, dose acceptance criteria.

STD COL 11.2-1 Mobile and temporary equipment are designed in accordance with the applicable mobile and temporary radwaste treatment systems guidance provided in Regulatory Guide 1.143, including the codes and standards listed in Table 1 of the Regulatory Guide.

Associated LNP COL Application Revisions:

See changes to FSAR Section 11.2.1.2.5.2 described above.

Attachments/Enclosures:

None.

NRC Letter No.: LNP-RAI-LTR-112

NRC Letter Date: March 11, 2013

NRC Review of Final Safety Analysis Report

NRC RAI #: Question 24734-7

Text of NRC RAI:

This is a follow up to the applicant's response to Question 11.02-4.

In reviewing the applicant's response to Question 11.02-4, staff has found the response partly responsive to the staff's technical and regulatory concerns based on the AP1000 DCD and endorsement of RG 1.143, Rev. 2. The staff has identified the following issues and requests further clarifications from the applicant. Specifically, the issues and questions are:

7. The COL Item in DCD FSAR Section 11.4.6 states, in part, that, "It will be the plant operator's responsibility to assure that the vendors have appropriate process control programs for the scope of the work being contracted at any particular time. The process control program will identify the operating procedures for storing or processing wet solid waste. The mobile systems process control program will include a discussion of conformance to Regulatory Guide 1.143." Therefore, the response to this COL item should include a revision to the FSAR which provides a discussion of how waste processing (as liquid, wet, and solid waste) and the storage of pre-processed and unpackaged waste in the RWB will be implemented and controlled in order to comply with RG 1.143, Rev. 2 dose and acceptance criteria, given the assigned classification of the RWB.

PGN RAI ID #: L-1035

PGN Response to NRC RAI:

As described in response to Questions 2, 3, and 4, the activity on each of up to three (3) mobile radwaste processing systems will be limited to an equivalent A_2 quantity of radionuclides. When the disposable media is removed from the system, the process control program will be utilized to move the media from mobile radwaste processing system components and place the media into a package suitable for shipping. The mobile radwaste processing system will not be placed back into service until the media that has been removed is packaged and ready for shipment. Thus, the source term associated with spent mobile radwaste processing system media during transfer and packaging is accounted for in the unmitigated release and exposure evaluations for the mobile radwaste processing systems.

FSAR Section 11.4.6 (STD COL 11.4-1) will be revised from:

STD COL 11.4-1 A Process Control Program (PCP) is developed and implemented in accordance with the recommendations and guidance of NEI 07-10A (Reference 201). The PCP describes the administrative and operational controls used for the solidification of liquid or wet solid waste and the dewatering of wet solid waste. Its purpose is to provide the necessary controls such that the final disposal waste product meets applicable federal regulations (10 CFR Parts 20, 50, 61, 71, and 49 CFR Part 173), state regulations, and disposal site waste form requirements for burial at a low level waste (LLW) disposal site that is licensed in accordance with 10 CFR Part 61.

Waste processing (solidification or dewatering) equipment and services may be provided by the plant or by third-party vendors. Each process used meets the applicable requirements of the PCP.

To read:

STD COL 11.4-1 A Process Control Program (PCP) is developed and implemented in accordance with the recommendations and guidance of NEI 07-10A (Reference 201). The PCP describes the administrative and operational controls used for the solidification of liquid or wet solid waste and the dewatering of wet solid waste. Its purpose is to provide the necessary controls such that the final disposal waste product meets applicable federal regulations (10 CFR Parts 20, 50, 61, 71, and 49 CFR Part 173), state regulations, and disposal site waste form requirements for burial at a low level waste (LLW) disposal site that is licensed in accordance with 10 CFR Part 61.

LNP COL 11.4-1 When the disposable media is removed from mobile radwaste processing system, the process control program is utilized to move the media from the system and place the media into a package suitable for shipping. The mobile radwaste processing system is not placed back into service until the media that has been removed is packaged and ready for shipment.

STD COL 11.4-1 Waste processing (solidification or dewatering) equipment and services may be provided by the plant or by third-party vendors. Each process used meets the applicable requirements of the PCP.

Associated LNP COL Application Revisions:

See changes to FSAR Section 11.4.6 described above.

Attachments/Enclosures:

None.

Table 1. Monitor Tank A_2 Activity Inventory

Nuclide	Nuclide A_2 Activity (Ci)	Reactor Coolant Activity (µCi/g)	Monitor Tank Activity (Ci)	A_2 Fraction
H-3	1.10E+03	1.00E+00	2.17E+00	1.97E-03
Br-83	(a)	3.20E-02		
Br-84	(a)	1.70E-02		
Br-85	(a)	2.00E-03		
I-129	unlimited	1.50E-08	3.28E-08	
I-130	(a)	1.10E-02		
I-131	1.90E+01	7.10E-01	1.55E+00	8.16E-02
I-132	1.10E+01	9.40E-01	2.05E+00	1.86E-01
I-133	1.60E+01	1.30E+00	2.84E+00	1.78E-01
I-134	8.10E+00	2.20E-01	4.80E-01	5.93E-02
I-135	1.60E+01	7.80E-01	1.70E+00	1.06E-01
Cs-134	1.90E+01	6.90E-01	1.50E+00	7.89E-02
Cs-136	1.40E+01	1.00E+00	2.17E+00	1.55E-01
Cs-137	1.60E+01	5.00E-01	1.09E+00	6.81E-02
Cs-138	(a)	3.70E-01		
Cr-51	8.10E+02	1.30E-03	2.84E-03	3.51E-06
Mn-54	2.70E+01	6.70E-04	1.46E-03	5.41E-05
Mn-56	8.10E+00	1.70E-01	3.71E-01	4.58E-02
Fe-55	1.10E+03	5.00E-04	1.09E-03	9.91E-07
Fe-59	2.40E+01	1.30E-04	2.84E-04	1.18E-05
Co-58	2.70E+01	1.90E-03	4.14E-03	1.53E-04
Co-60	1.10E+01	2.20E-04	4.80E-04	4.36E-05
Rb-88	(a)	1.50E+00		
Rb-89	(a)	6.90E-02		
Sr-89	1.60E+01	1.10E-03	2.41E-03	1.51E-04
Sr-90	8.10E+00	4.90E-05	1.07E-04	1.32E-05
Sr-91	8.10E+00	1.70E-03	3.71E-03	4.58E-04
Sr-92	8.10E+00	4.10E-04	8.94E-04	1.10E-04
Y-90	(b)	1.30E-05	2.84E-05	
Y-91m	(b)	9.20E-04	2.01E-03	
Y-91	1.60E+01	1.40E-04	3.06E-04	1.91E-05
Y-92	(b)	3.40E-04	7.42E-04	
Y-93	8.10E+00	1.10E-04	2.41E-04	2.98E-05
Zr-95	2.20E+01	1.60E-04	3.49E-04	1.59E-05
Nb-95	2.70E+01	1.60E-04	3.49E-04	1.29E-05
Mo-99[(c)]	2.00E+01	2.10E-01	4.58E-01	2.29E-02
Tc-99m	(b)	2.00E-01	4.36E-01	
Ru-103	5.40E+01	1.40E-04	3.06E-04	5.67E-06
Rh-103m	(b)	1.40E-04	3.06E-04	
Rh-106[(d)]	1.20E+02	4.50E-05	9.81E-05	8.18E-07
Ag-110m	1.10E+01	4.00E-04	8.72E-04	7.93E-05

Table 1. Monitor Tank A_2 Activity Inventory

Nuclide	Nuclide A_2 Activity (Ci)	Reactor Coolant Activity (μCi/g)	Monitor Tank Activity (Ci)	A_2 Fraction
Te-127m	1.40E+01	7.60E-04	1.66E-03	1.19E-04
Te-129m	1.10E+01	2.60E-03	5.67E-03	5.15E-04
Te-129	(b)	3.80E-03	8.29E-03	
Te-131m	1.40E+01	6.70E-03	1.46E-02	1.04E-03
Te-131	(b)	4.30E-03	9.38E-03	
Te-132	1.10E+01	7.90E-02	1.72E-01	1.56E-02
Te-134	(a)	1.10E-02		
Ba-137m	(b)	4.70E-01	1.02E+00	
Ba-140	8.10E+00	1.00E-03	2.17E-03	2.68E-04
La-140	(b)	3.10E-04	6.75E-04	
Ce-141	1.60E+01	1.60E-04	3.49E-04	2.18E-05
Ce-143	1.60E+01	1.40E-04	3.06E-04	1.91E-05
Pr-143	1.60E+01	1.50E-04	3.28E-04	2.05E-05
Ce-144	5.40E+00	1.20E-04	2.62E-04	4.85E-05
Pr-144	(a)	1.20E-04		
Total		**8.30E+00**	**1.81E+01**	**1.00E+00**

Notes to Table 1.

(a) These nuclides do not have a specific A_2 value in Table A-1 of 10 CFR 71 Appendix A and have relatively short half-lives. They are not included in the calculation of the mixture A_2 quantity.

(b) A_2 values for these radionuclides are not included since they are included in their parent radionuclides. The half-lives of the daughter radionuclides are less than 10 days.

(c) The A_2 value for Mo-99 is listed as 1.6E+01 Ci. However, it is noted after Table A-1 in 10 CFR 71, Appendix A that the A_2 value of Mo-99 is 2.0E+01 Ci for domestic use.

(d) The A_2 value for Ru-106 is used for Rh-106 since there is no value for Rh-106 in Table A-1 of 10 CFR 71, Appendix A and Ru-106 and Rh-106 are in secular equilibrium.