ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Monday, November 08, 2010 3:55 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); NOXON David (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 436, FSAR Ch. 11, OPEN ITEM, Supplement 2
Attachments: RAI 436 Supplement 2 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 436 on September 27,2010. Supplement 1 to RAI No. 436 was sent on October 22, 2010 which provided technically correct and complete responses to 2 of the 3 questions. The attached file, "RAI 436 Supplement 2 Response US EPR DC.pdf," provides a technically correct and complete response to the one remaining question.

Appended to this file are the affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the responses to RAI 436 Question 11.02-26.

The following table indicates the respective pages in the response document, "RAI 436 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 436 — 11.02-26	2	4

This concludes the formal AREVA NP response to RAI 436, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Friday, October 22, 2010 1:59 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 436, FSAR Ch. 11, OPEN ITEM, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 436 on September 27,2010. The attached file, "RAI 436 Supplement 1 Response US EPR DC.pdf," provides technically correct and complete responses to 2 of the 3 questions.

Appended to this file are the affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the responses to RAI 436 Questions 11.05-26 and 11.05-27.

The following table indicates the respective pages in the response document, "RAI 436 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 436 — 11.05-26	2	3
RAI 436 — 11.05-27	4	4

The schedule for technically correct and complete response to the one remaining question is unchanged and is provided below.

Question #	Response Date
RAI 436 — 11.02-26	November 22, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Monday, September 27, 2010 2:33 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); NOXON David (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 436, FSAR Ch. 11, OPEN ITEM

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 436 Response US EPR DC.pdf," provides the schedule for technically correct and complete responses to these questions.

The following table indicates the respective pages in the response document, "RAI 436 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 436 — 11.02-26	2	3
RAI 436 — 11.05-26	4	4
RAI 436 — 11.05-27	5	5

The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 436 — 11.02-26	November 22, 2010

RAI 436 — 11.05-26	November 1, 2010
RAI 436 — 11.05-27	November 1, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, August 27, 2010 5:47 PM
To: ZZ-DL-A-USEPR-DL
Cc: Dehmel, Jean-Claude; Roach, Edward; Patel, Jay; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 436 (4849, 4968),FSAR Ch. 11, OPEN ITEM

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 17, 2010, and on August 27, 2010, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 2242

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB710833904B)

Subject: Response to U.S. EPR Design Certification Application RAI No. 436, FSAR Ch. 11, OPEN ITEM, Supplement 2
Sent Date: 11/8/2010 3:54:50 PM
Received Date: 11/8/2010 3:56:46 PM
From: BRYAN Martin (EXTERNAL AREVA)

Created By: Martin.Bryan.ext@areva.com

Recipients:
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>
Tracking Status: None
"NOXON David (AREVA)" <David.Noxon@areva.com>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	5394	11/8/2010 3:56:46 PM
RAI 436 Supplement 2 Response US EPR DC.pdf	144659	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Response to

Request for Additional Information No. 436(4849, 4968), Revision 1, Supplement 2

8/27/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 11.02 - Liquid Waste Management System
SRP Section: 11.05 - Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems

Application Sections: 11.2 & 11.5

QUESTIONS for Health Physics Branch (CHPB)

Question 11.02-26:

OPEN ITEM

Follow-up to Open Item RAI 359, Question 11.02-18 (Re: Supplement 1 response)

Under RAI 359, Question 11.02-18, the staff noted that FSAR Tier 2, Rev. 1, Section 11.2.3.8 commitment to RG 1.143 for the LWMS was unsubstantiated in the context of the requirements identified in FSAR, Tier 2, Rev. 1, Chapter 17. The applicant was requested to either revise the cited topical report (Appendix B of Areva Topical Report ANP-10266A) by including RG 1.143 in the list of documents, or describe in FSAR Tier 2, Section 11.2.3.8 the elements of QA program and identify related COL information item(s) that address the design, fabrication, procurement, and installation of the LWMS based on the guidance of RG 1.143 for permanently installed and skid-mounted systems. The RAI requested that parallel revisions be made in FSAR Section 11.3 for the GWMS and FSAR Section 11.4 for the SWMS. In a response, dated May 6, the applicant proposed the following changes to FSAR Section 11.2.3.8:

"*The quality assurance program governing design, fabrication, procurement, and installation of the liquid waste storage and processing systems conform to RG 1.143, as indicated in Table 3.2.2-1. Implementation of the quality assurance program is described in Chapter 17*."

The applicant proposed similar updates for FSAR Sections 11.3.3.7 (GWMS) and 11.4.6 (SWMS).

Based on a CHPB and QVBA staff review of the May 6 response, the applicant is requested to address and resolve the following items in the respective FSAR sections:

1. In stating that the implementation of the QA program is described in FSAR Section 17, the applicant is requested to make a clear distinction among those elements of the QA program that are mandated under the requirements of Part 50, Appendix B, as identified in FSAR Table 3.2.2-1, versus those that would be implemented under RG 1.143 which should be described in FSAR Section 11.2 for the LWMS, FSAR Section 11.3 for the GWMS, and FSAR Section 11.4 for the SWMS.
2. In describing the implementation of the QA program that would be implemented under RG 1.143, the applicant is requested to endorse the following industry guidance: ANSI/ANS-55-6-1993 (Reaffirmed May 14, 2007) for the LWMS; ANSI/ANS-55-4-1993 (Reaffirmed May 14, 2007) for the GWMS; and ANSI/ANS-40-37-2009 for the SWMS. Note that RG 1.143 and the respective SRP sections make reference to these ANSI/ANS industry standards.
3. For the permanently installed LWMS, as described in the FSAR Section 11.2, the applicant is requested to clarify those aspects of the RG 1.143 QA program that would be the responsibility of the COLA for the development of procurement specifications, and for confirming the proper fabrication and installation of the LWMS.
4. For skid mounted-LWMS and SWMS, described as COLA options in FSAR Sections 11.2.2 and 11.4.1, the applicant is requested to clarify those aspects of the RG 1.143 QA program that would be the responsibility of the COLA for the design and development of procurement specifications, proper fabrication, and for confirming the operational interface of supplemental skid-mounted processing subsystems with the permanently installed LWMS and SWMS.

5. For the permanently installed GWMS, as described in the FSAR Section 11.3, the applicant is requested to clarify those aspects of the RG 1.143 QA program that would be the responsibility of the COLA for the development of procurement specifications and in confirming the proper fabrication and installation of the GWMS against those portions of the GWMS system that fall under the requirements of Part 50, Appendix B QA program as identified in FSAR Table 3.2.2-1.

Response to Question 11.02-26:

1. U.S. EPR FSAR Tier 2, Table 3.2.2-1 shows the components designated as Supplemented Grade (NS-AQ) safety class and reference Regulatory Guide (RG) 1.143 in the comment column. As shown in U.S. EPR FSAR Tier 2, Table 3.2.2-1, 10 CFR 50, Appendix B requirements are not applicable to these components (they are designated as “no” under the 10 CFR Appendix B column). Quality assurance (QA) for these components is implemented following the guidance of RG 1.143.

   In accordance with RG 1.143, Section 7, AREVA NP has established and documented a Quality Assurance Program (QAP) that meets the requirements of ANSI/ANS 55.6-1993 for the system designer. The applicable QAP requirements are implemented in accordance with Topical Report ANP-10266A, Addendum A. Specifically, applicable elements of Topical Report ANP-10266A, Addendum A meet the requirements of RG 1.143 and ANSI/ANS 55.6-1993.

   RG 1.143, Section 7, states in part that a quality assurance program acceptable to the NRC is presented in ANSI/ANS-55.6-1993. This QA program can be applied to LWMS, GWMS and SWMS as indicated in the regulatory guide.

   ANSI/ANS-55.6-1993, Section 4.3 provides the Quality Assurance requirements to be implemented in addition to codes and standards specified in Table 1.

   AREVA as the system designer, is required to establish quality control features as stated in Section 4.3.1.1 of ANSI/ANS-55.6-1993. Section 4.3.1.1 states in part that the design documents shall be verified for conformance to the requirements of this standard by an individual or individuals within the design organization who are not the originators of the document. Changes to these documents shall be verified or controlled to maintain conformance to this standard.

   Addendum A of the AREVA Topical Report ANP-10266A, Section A-3, Design Control, addresses and implements both the verification and control of changes to design documents as required by ANSI/ANS-55.6-1993 and therefore meets the requirements.

   As stated in Topical Report ANP-10266A and verified in the Safety Evaluation Report (SER), design certification does not include fabrication, erection, installation, or operations. The COL applicant is responsible for the QA requirements related to the system procurer and the system constructor.

   U.S. EPR FSAR Tier 2, Section 11.2.3.8, Section 11.3.3.7, and Section 11.4.6 will be revised for clarity.

2. U.S. EPR FSAR Tier 2, Section 11.2.3.8 will be revised to state that implementation of QA for the design of the liquid waste management system (LWMS) follows the guidance of ANSI/ANS-55.6-1993 (Reaffirmed May 14, 2007). A reference to ANSI/ANS-55.6-1993 will be added to U.S. EPR FSAR Tier 2, Section 11.2.5.

   U.S. EPR FSAR Tier 2, Section 11.3.3.7 will be revised to state that implementation of QA for the design of the gaseous waste management system (GWMS) follows the guidance of ANSI/ANS-55.4-1993 (Reaffirmed May 14, 2007). A reference to ANSI/ANS-55.4-1993 will be added to U.S. EPR FSAR Tier 2, Section 11.3.5.

   U.S. EPR FSAR Tier 2, Section 11.4.6 will be revised to state that implementation of QA for the design of the solid waste management system (SWMS) follows the guidance of ANSI/ANS-40.37-2009. A reference to ANSI/ANS-40.37-2009 will be added to U.S. EPR FSAR Tier 2, Section 11.4.7.

3. As stated in RG 1.143, Section 7, ANSI/ANS 55.6-1993, Section 4.3 provides the basis for an acceptable QAP. As stated in Topical Report ANP-10266A and verified in the SER, design certification does not include fabrication, erection, installation, or operations. The design certification applicant is responsible for the QA requirements of the system designer, and the COL applicant is responsible for the QA requirements related to the system procurer and the system constructor, as stated in ANSI/ANS 55.6-1993, Section 4.3.

   U.S. EPR FSAR Tier 2, Section 11.2 will be revised for clarity.

4. RG 1.143, Section 7 states that ANSI/ANS 40.37, Section 7, and ANSI/ANS 55.6-1993, Section 4.3 provides the basis for an acceptable QAP. The COL applicant is responsible for the QA requirements as stated in ANSI/ANS 55.6-1993, Section 4.3 and ANSI/ANS 40.37-1993, Section 7. COL items in U.S. EPR FSAR Tier 2, Sections 11.2.1.2.4 and 11.4.1.2.5 will be revised to reflect these requirements, with corresponding revisions to U.S. EPR FSAR Tier 2, Table 1.8-2.

5. The QAP governing the design of the GWMS conforms to ANSI/ANS 55.4-1993, Section 4.3 and RG 1.143, Section 7. As stated in Topical Report ANP-10266A and verified in the SER, design certification does not include fabrication, erection, installation, or operations. The design certification applicant is responsible for the QA requirements of the system designer, and the COL applicant is responsible for the QA requirements related to the system procurer and the system constructor as stated in ANSI/ANS 55.4-1993, Section 4.3.

   U.S. EPR FSAR Tier 2, Table 3.2.2-1 notes that the containment isolation valves (CIVs) and associated piping are included in the requirements of 10 CFR 50 Appendix B, QAP.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 11.2.1.2.4, Section 11.2.3.8, Section 11.2.5, Section 11.3.3.7, Section 11.3.5, Section 11.4.1.2.5, Section 11.4.6, Section 11.4.7, and Table 1.8-2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 26 of 37

Item No.	Description	Section
11.2-5	A COL applicant that references the U.S. EPR design certification will confirm that the site-specific data (such as distance from release location to unrestricted area, contaminant migration time, and dispersion and dilution in surface or ground water) are bounded by those specified in Section 11.2.3.7. For site-specific parameters that exceed the values provided in Section 11.2.3.7, a COL applicant that references the U.S. EPR design certification will provide a site-specific analysis to demonstrate that the resulting water concentrations in the unrestricted area would meet the concentration limits of 10 CFR Part 20, Appendix B, Table 2 using the guidance provided in SRP Sections 2.4.12, 2.4.13, 11.2 and BTP 11-6.	11.2.3.7
11.2-6	A COL applicant that references the U.S. EPR design certification and that chooses to install and operate mobile skid-mounted processing systems connected to permanently installed LWMS processing equipment will include plant and site-specific information describing how design features and implementation of operating procedures for the LWMS will address the requirements of 10 CFR Part 20.1406(b) and guidance of SRP Section 11.2, RG 4.21 and 1.143, IE Bulletin 80-10, ~~and~~ NEI 08-08 and all quality assurance requirements as stated in Section 4.3 of ANSI/ANS 55.6-1993.	11.2.1.2.4 11.02.26
11.3-1	A COL applicant that references the U.S. EPR design certification will perform a site-specific gaseous waste management system cost-benefit analysis.	11.3.4
11.3-2	A COL applicant that references the U.S. EPR design certification will provide a discussion of the onsite vent stack design parameters and site-specific release point characteristics.	11.3.3.3
11.3-3	A COL applicant that references the U.S. EPR design certification will confirm that the site-specific parameters are bounded by those provided in Table 11.3-4 and the dose pathways provided in Section 11.3.3.4. For site-specific parameters that are not bounded by the values provided in Table 11.3-4 and dose pathways other than those provided in Section 11.3.3.4, a COL applicant that references the U.S. EPR design certification will perform a site-specific gaseous pathway dose analysis following the guidance provided in RG 1.109 and RG 1.111, and compare the doses to the numerical design objectives of 10 CFR Part 50, Appendix I and demonstrate compliance with requirements of 10 CFR Part 20.1302 and 40 CFR Part 190.	11.3.3.4

Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 28 of 37

Item No.	Description	Section
11.4-2	A COL applicant that references the U.S. EPR design certification and that chooses to install and operate mobile skid-mounted processing systems connected to permanently installed solid waste management system (SWMS) processing equipment will include plant and site-specific information describing how design features and implementation of operating procedures for the SWMS will address the requirements of 10 CFR Part 20.1406(b) and guidance of SRP Section 11.4, Regulatory Guides 4.21 and 1.143, IE Bulletin 80-10, industry standards, ~~and~~ NEI 08-08, and all quality assurance requirements as stated in Section 7 of ANSI/ANS 40.37-1993.	11.4.1 11.02-26
11.4-3	A COL applicant that references the U.S. EPR design certification will address plant-specific commitments to address the long-term storage of LLRW beyond the provisions described in the U.S. EPR design certification when such storage capacity is exhausted and describe how additional onsite LLRW storage or alternate LLRW storage will be integrated in plant operations. To address the need for additional storage, the commitment will address the requirements of 10 CFR Part 20, Appendix B (Table 2, Column 1 and 2); dose limits of 10 CFR 20.1301, 20.1302, and 20.1301(e) in unrestricted areas; Part 20.1406(b) in minimizing the contamination of plant facilities and environs; and design objectives of Sections II.A, II.B, II.C, and II.D of Appendix I to 10 CFR Part 50. The design and operations of additional onsite storage capacity will be integrated in the plant-specific process control program and consider the guidance of SRP Section 11.4 and Appendix 11.4-A, Regulatory Guides 1.206, 4.21 and 1.143, IE Bulletin 80-10, industry standards, and NEI 08-08.	11.4.1
11.5-1	A COL applicant that references the U.S. EPR design certification will fully describe, at the functional level, elements of the process and effluent monitoring and sampling programs required by 10 CFR 50 Appendix I, and 10 CFR 52.79 (a)(16). This program description, Offsite Dose Calculation Manual (ODCM), will specify how a licensee controls, monitors, and performs radiological evaluations of releases. The program will also document and report radiological effluents discharged to the environment. NEI 07-09A is an alternate means of demonstrating compliance with GL 89-01 and SECY 05-0197 until a plant and site-specific ODCM is developed under a license condition.	11.5.2

describing how design features and implementation of operating procedures for the LWMS will address the requirements of 10 CFR Part 20.1406(b) and guidance of SRP Section 11.2, RG 4.21 and 1.143, IE Bulletin 80-10, ~~and~~ NEI 08-08 and all quality assurance requirements as stated in Section 4.3 of ANSI/ANS 55.6-1993 (Reference 7).

11.02-26

11.2.2 System Description

The U.S. EPR liquid waste storage and liquid waste processing systems manage liquid wastes generated by the plant during normal modes of operation. The liquid waste storage system collects and segregates incoming waste streams, provides initial chemical treatment of those wastes, and delivers them to one of the processing systems. The liquid waste processing system uses evaporation, centrifugal separation, and demineralization to remove the radioactive and chemical contaminants from the wastewater and to concentrate those contaminants. The treated wastewater is returned to the liquid waste storage system for monitoring and eventual release. The concentrates are returned to the liquid waste storage system concentrate tanks for eventual transfer to the radioactive concentrates processing system.

The liquid waste storage and processing systems operate independently of the operating modes of the plant. The systems provide sufficient storage and treatment capacity to process the daily inputs produced during plant startup, normal operation, plant shutdown, maintenance, and refueling periods. The systems are operated on an as-needed basis throughout the plant operating cycle. Operating experience has shown that the peak volume demand occurs during plant outages, when maintenance activities generate increased volumes of wastewater (particularly the Group II wastewater streams).

The liquid waste storage system, schematically illustrated in Figure 11.2-1—Liquid Waste Storage System includes liquid waste storage tanks, concentrate tanks, and monitoring tanks that temporarily store the liquid wastes at various stages of treatment. The system also includes recirculation pumps, a sludge pump, a concentrate pump, and combination recirculation-discharge pumps to move the liquid waste between the various tanks. Chemical tanks and chemical proportioning pumps precisely mix and inject chemicals to treat the liquid wastes. Piping and control valves route the liquid wastes between the storage system tanks and pumps, and to interfaces with the liquid waste processing system.

The liquid waste processing system consists of three separate unit operations:

- The evaporator, shown in Figure 11.2-2—Liquid Waste Processing System, Evaporator System, employs a vapor-compressor evaporator with a separate evaporator column. The evaporator system also includes evaporator feed, forced recirculation, and distillate pumps to move liquid waste through the evaporation process; several heat exchangers to condition the liquid waste at various stages of

Table 11.2-8 shows the resulting radionuclide concentrations at the potable water supply in comparison to the effluent concentration limits of 10 CFR Part 20, Appendix B, Table 2 for a postulated rupture and unmitigated release of the entire contents of the reactor coolant storage tank. The resulting sum-of-the-ratios is 0.6, which is below the allowable value of 1.0 in accordance with ~~10 CFR Part 20~~ the acceptance criteria of BTP 11-6.

A COL applicant that references the U.S. EPR design certification will confirm that the site-specific data (such as distance from release location to unrestricted area, contaminant migration time, and ~~discharge flow rate~~dispersion and dilution in surface or ground water) are bounded by those specified in Section 11.2.3.7. For site-specific parameters that exceed the values provided in Section 11.2.3.7, a COL applicant that references the U.S. EPR design certification will provide a site-specific analysis to demonstrate that the resulting water concentrations in the unrestricted area would meet the concentration limits of 10 CFR Part 20, Appendix B, Table 2 using the guidance provided in SRP Sections 2.4.12, 2.4.13, 11.2 and BTP 11-6. In addition, as addressed in Section 11.5.2, the COL applicant will fully describe the elements of the radioactive effluent monitoring program (REMP) as part of the Offsite Dose Calculation Manual (ODCM). The REMP will reflect ~~recent~~current nuclear industry ground water initiatives and NRC assessments of existing nuclear reactors related to groundwater contamination and monitoring and compliance with NRC regulations.

11.2.3.8 Quality Assurance

11.02-26

~~The quality assurance program governing design, fabrication, procurement, and installation of the liquid waste storage and processing systems conform to RG 1.143, as indicated in Table 3.2.2-1. Implementation of the quality assurance program is described in Chapter 17.~~The quality assurance program governing the design of the liquid waste storage and processing systems conforms to ANSI/ANS 55.6-1993 Section 4.3, as described in Regulatory Guide 1.143 Section 7 and indicated in Table 3.2.2-1. Implementation of the quality assurance as it relates to design is described in Chapter 17. The COL applicant is responsible for quality assurance requirements related to the system procurer and the system conductor.

11.2.4 Liquid Waste Management System Cost-Benefit Analysis

10 CFR Part 50, Appendix I requires that plant designs consider additional items based on a cost-benefit analysis. Specifically, the design must include all items of reasonably demonstrated cleanup technology that, when added to the liquid waste processing system sequentially and in order of diminishing cost-benefit return, can, at a favorable cost-benefit ratio, reduce the dose to the population reasonably expected to be within 50 miles of the reactor. A COL applicant that references the U.S. EPR design certification will perform a site-specific liquid waste management system cost-benefit analysis.

11.2.5 References

1. NUREG-0017, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Pressurized Water Reactors PWR-GALE Code," Revision 1, U.S. Nuclear Regulatory Commission, April 1985.

2. NUREG/CR-4013, "LADTAP II – Technical Reference and User Guide," U.S. Nuclear Regulatory Commission, April 1986.

3. NUREG-0800, BTP 11-6, "Postulated Radioactive Releases Due To Liquid-Containing Tank Failures," Revision 3, U.S. Nuclear Regulatory Commission, March 2007.

4. Deleted.

5. DC/COL-ISG-013, Interim Staff Guidance on NUREG-0800 Standard Review Plan Section 11.2 and Branch Technical Position 11-6, "Assessing the Consequences of an Accidental Release of Radioactive Materials from Liquid Waste Tanks for Combined License Applications Submitted Under 10 CFR Part 52," Draft Issued for Comments, U.S. Nuclear Regulatory Commission, Federal Register Volume 75, No. 36, February 2010.

6. Health Physics Journal, Vol. 59, No. 4, "Default Soil Solid/Liquid Partition Coefficients, Kds, for Four Major Soil Types: A Compendium," October 1990, p. 471-482.

7. ANSI/ANS 55.6-1993, R2007 (R=Reaffirmed): "Liquid Radioactive Waste Processing System for Light Water Reactor Plants," American National Standards Institute/American Nuclear Society, 2007.

RAI 436 Question 11.02-26

there is a radiation monitor in the auxiliary building ventilation system exhaust that alerts MCR operators of the discharge of radioactive gas.

- The RCS noble-gas concentration is at 230 DE Xe-133 µCi/g, based on the minimum RCS degasification flow rate of 10 kg/second (79365 lbm/hr). This concentration is about 10 percent higher than the TS limit of 210 DE Xe-133 µCi/g (see Table 11.1-2 for the individual radionuclide concentrations), which was also based on 10 kg/second degasification rate.

- The RCS degasification flow rate is then increased to 20 kg/second (158730 lbm/hr, the upper range for normal operation), at which time the valve-misalignment error is assumed to take place. Noble-gas injection into the RCS from fuel defects is assumed to continue.

- Ensuing release to the atmosphere is assumed to be direct, continuous, and unabated. The release is terminated one hour after the incident as a result of the automatic alarm in the MCR and operator action (an assumed conservative interval that is twice as long as the typical time allocated for such applications).

- Atmospheric dispersion factor at the receptor of interest (at the EAB) is 1.0E-03 seconds/m^3 (FSAR Table 2.1-1).

- Ensuing dose is computed by considering each individual noble-gas isotope in the release, along with the corresponding dose conversion factors in Federal Guidance Report 12 for submersion in a semi-infinite medium.

A COL applicant that references the U.S. EPR design certification will confirm that the site-specific accident atmospheric dispersion data is bounded by the values provided in Table 2.1-1. For site-specific accident atmospheric dispersion data that exceed the values provided in Table 2.1-1, a COL applicant that references the U.S. EPR design certification will provide a site-specific analysis demonstrating that the resulting dose at the exclusion area boundary associated with a radioactive release due to gaseous waste system leak or failure does not exceed 0.1 rem in accordance with SRP Section 11.3, BTP 11-5.

11.3.3.7 Quality Assurance

RAI 436 Question 11.02-26

~~The quality assurance program governing design, fabrication, procurement, and installation of the gaseous waste processing system conforms to RG 1.143 as indicated in Table 3.2.2-1. Implementation of the quality assurance program is described in Chapter 17.~~The quality assurance program governing the design of the gaseous waste management system conforms to ANSI/ANS 55.4-1993 Section 4.3 (Reference 6), and Regulatory Guide 1.143 Section 7 as indicated in Table 3.2.2-1. Implementation of the quality assurance as it relates to design is described in Chapter 17. The COL applicant is responsible for quality assurance requirements related to the system procurer and the system constructor. For the containment isolation valves and associated piping, the

quality assurance program meets the requirements of Appendix B to 10 CFR Part 50 and Section III-ND of the ASME Boiler and Pressure Vessel Code (Reference 4).

11.3.4 Gaseous Waste Management System Cost-Benefit Analysis

10 CFR Part 50, Appendix I requires that plant designs consider additional items based on a cost-benefit analysis. Specifically, the design must include all items of reasonably demonstrated cleanup technology that, when added to the gaseous waste processing system sequentially and in order of diminishing cost-benefit return, can, at a favorable cost-benefit ratio, reduce the dose to the population reasonably expected to be within 50 miles of the reactor. A COL applicant that references the U.S. EPR design certification will perform a site-specific gaseous waste management system cost-benefit analysis.

11.3.5 References

1. NUREG-0017, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Pressurized Water Reactors PWR-GALE Code," Revision 1, U.S. Nuclear Regulatory Commission, April 1985.

2. NUREG/CR-4653, "GASPAR II – Technical Reference and User Guide," U.S. Nuclear Regulatory Commission, March 1987.

3. NUREG-0800, BTP 11-5, "Postulated Radioactive Releases Due To A Waste Gas System Leak or Failure," Revision 3, U.S. Nuclear Regulatory Commission, March 2007.

4. ASME Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Facility Components," The American Society of Mechanical Engineers, 2004.

5. Deleted.

6. ANSI/ANS-55.4-1993, R2007 (R=Reaffirmed): "Gaseous Radioactive Waste Processing Systems for Light Water Reactor Plants," American National Standards Institute/American Nuclear Society, 2007.

RAI 436 Question 11.02-26

GDC 61. In addition, area radiation monitors throughout the Radioactive Waste Processing Building detect excessive radiation levels and alert the operators to this condition, in accordance with GDC 63. Area radiation monitoring is addressed in detail in Section 12.3.4. The dried, filled solid waste drums are stored for a sufficient time to allow the short lived radionuclides to decay before shipping offsite in accordance with NUREG-0800, BTP 11-3 (Reference 1) and 10 CFR 61.55 and 61.56.

11.4.1.2.5 Mobile Systems

A COL applicant that references the U.S. EPR design certification and that chooses to install and operate mobile skid-mounted processing systems connected to permanently installed solid waste management system (SWMS) processing equipment will include plant and site-specific information describing how design features and implementation of operating procedures for the SWMS will address the requirements of 10 CFR Part 20.1406(b) and guidance of SRP Section 11.4, Regulatory Guides 4.21 and 1.143, IE Bulletin 80-10, industry standards, ~~and~~ NEI 08-08, and all quality assurance requirements as stated in Section 7 of ANSI/ANS 40.37-1993 (Reference 11).

RAI 436 Question 11.02-26

11.4.2 System Description

11.4.2.1 Solid Waste Processing and Storage System (Dry Solid Waste)

The solid waste processing and storage system handles the waste generated in the different controlled areas of the plant independent from the plant operating conditions. Solid radioactive wastes consist of paper, plastic, cloth, wood, metal parts, worn-out items, concrete, glass, electrical parts, HEPA filters, iodine filter media, and other potentially contaminated discarded materials generated throughout the controlled area. These wastes are collected, segregated, and treated according to their properties. The wastes are placed in different containers to simplify handling, storage, and transport of the waste in the plant. Typical waste containers used are plastic bags, drums, or bins, which are transferred and placed in interim storage areas of the Radioactive Waste Processing Building. Solid waste treatment facilities include the sorting box for sorting waste. This sorting box contains a shredder and a compactor for in-drum compaction of compressible waste.

Wastes are initially classified as combustible, compressible or noncombustible and noncompressible. Compressible waste is compacted to reduce its volume. The wastes are further segregated based on properties, sizes, materials, and activity of the waste material. Waste containing moisture is collected and stored separately to avoid wetting dry active waste and to allow short-term treatment to prevent decomposition and hydrogen formation.

The combustible and compressible wastes are transferred from the storage rooms to the treatment area (e.g., compaction and compression), placed into storage drums, and compacted for temporary storage. The noncombustible and noncompressible wastes

11.4.6 Quality Assurance

~~The quality assurance program governing design, fabrication, procurement, and installation of the solid waste management system conforms to RG 1.143 as indicated in Table 3.2.2-1. Implementation of the quality assurance program is described in Chapter 17.~~The quality assurance program governing the design of the solid waste management systems conforms to ANSI/ANS 40.37-1993 Section 7, and Regulatory Guide 1.143 Section 7 as indicated in Table 3.2.2-1. Implementation of the quality assurance as it relates to design is described in Chapter 17. The COL applicant is responsible for quality assurance requirements related to the system procurer and the system constructor.

11.02-26

11.4.7 References

1. NUREG-0800, BTP 11-3, "Design Guidance For Solid Radioactive Waste Management Systems Installed In Light-Water-Cooled Nuclear Power Reactor Plants," Revision 3, U.S. Nuclear Regulatory Commission, March 2007.

2. NUREG-0800, "U.S. NRC Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," U.S. Nuclear Regulatory Commission, March 2007.

3. ANSI/ANS-55.1-1992, "Solid Radioactive Waste Processing System for Light-Water-Cooled Reactor Plants," American Nuclear Society, 1992.

4. Generic Letters 80-09, "Low Level Radioactive Waste Disposal," U.S. Nuclear Regulatory Commission, January 1980.

5. Generic Letters 81-38, "Storage of Low Level Radioactive Wastes at Power Reactor Sites," U.S. Nuclear Regulatory Commission, November 1981.

6. Generic Letters 81-39, "NRC Volume Reduction Policy," U.S. Nuclear Regulatory Commission, November 1981.

7. NUREG/CR-2907, "Radioactive Materials Released from Nuclear Power Plants, Annual Report," Vol. 14, U.S. Nuclear Regulatory Commission, December 1995.

8. ANS/ANSI-18.1-1999, "American National Standard-Radioactive Source Term for Normal Operation of Light Water Reactors," American Nuclear Society/American National Standards Institute, September 21, 1999.

9. NUMARC/NESP-006, "The Management of Mixed Low-Level Radioactive Waste in the Nuclear Power Industry," Nuclear Management Resources Council, Inc., Washington, D.C., January 1990.

10. NEI 07-10A, "Generic FSAR Template for Process Control Program," Nuclear Energy Institute.

11. ANSI/ANS-40.37-2009, "Mobile Low-Level Radioactive Waste Processing Systems," American National Standards Institute/American Nuclear Society, 2009.

RAI 436 Question 11.02-26