RAIO-1218-63854

December 17, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
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SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 508 (eRAI No. 9621) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 508 (eRAI No. 9621)," dated October 16, 2018

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 9621:

- 12.02-32

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Carrie Fosaaen at 541-452-7126 or at cfosaaen@nuscalepower.com.

Sincerely,

Zackary W. Rad
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9621

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9621

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Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 9621

Date of RAI Issue: 10/16/2018

NRC Question No.: 12.02-32

Regulatory Basis

10 CFR 52.47(a)(5) requires applicants to identify the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radiation exposures within the limits set forth in part 20 of this chapter.

GDC Criterion 60— "Control of releases of radioactive materials to the environment," requires that the nuclear power unit design include means to control suitably the release of radioactive materials in gaseous and liquid effluents and to handle radioactive solid wastes produced during normal reactor operation, including anticipated operational occurrences.

Criterion 61—"Fuel storage and handling and radioactivity control," requires systems which may contain radioactivity to be designed with suitable shielding for radiation protection and with appropriate containment, confinement, and filtering systems.

RG 1.143 provides design guidance for radwaste systems based on the radioactive material contents within the systems.

DSRS Section 12.3-12.4 states that, "The areas inside the plant structures, as well as in the general plant yard, should be subdivided into radiation zones, with maximum design dose rate zones and the criteria used in selecting maximum dose rates identified."

Background

In the response to RAI 9161, Question 11.01-1, the applicant revised the source terms for the

gaseous radioactive waste system components in Table 12.2-16 and 12.2-17, based on the revisions to the assumed design basis failed fuel fraction and other associated changes. The staff notes that in comparing the original Table 12.2-16 and 12.2- 17 to the revised tables, the source terms for the gaseous radioactive waste system components have decreased, yet the response does not provide any information describing why the source term would decrease when the design basis failed fuel fraction has increased. Also, it is unclear why there would be an overall decrease in the gaseous radioactive waste management system source terms in the response to RAI 9161, Question 11.01-1.

In addition, in DCD Sections 9.3.4.2.3 and 9.3.4.5, state that the reactor pressure vessel high point degasification line is the primary method for removing non-condensable gases that accumulate in the pressurizer gas/vapor space. Section 9.3.4.2.3 also states that these gases consist of fission gases and gases introduced by system ingress. Finally, Section 9.3.4.2.3 specifies that pressurizer venting is used during NPM shutdown to remove non- condensable gases and accelerate hydrogen removal from the RCS.

During the GALE audit, as part of the staff's review of gaseous radioactivity source terms and gaseous releases, staff reviewed the inputs to the gaseous radwaste management system. The radioactivity in the gaseous radwaste management system appeared to be based on gases striped by a degasifier in the low conductivity waste subsystem and leaked gases sent to the gaseous radwaste system from the containment evacuation system. While this accounts for all the radioactivity that would be expected to accumulate in the gaseous radwaste system when all units are operating, it does not account for the radioactivity that could be expected to accumulate when the RCS is degassed through the pressurizer during shutdown. When degasifying through the pressurizer for shutdown, staff expects a significantly greater flow rate of gas to the gaseous radwaste systems, which will likely result in a significant spike in radioactivity in the gaseous radwaste system guard and decay beds. Since a NuScale plant could have up to 12 nuclear power modules operating, with 2 year fuel cycles, the process of degassing through the pressurizer could occur once every two months. The assumed holdup time in the beds for Xenon and Krypton in DCD Table 11.3-1, is 45 days and 1.9 days, respectively. Therefore, a spike in radioactivity in these beds from degassing for shutdown could impact the source terms in these components for a significant portion of plant operation, since an outage will occur every 60 days.

Also, during the GALE audit, staff asked NuScale if they considered degassing through the pressurizer during shutdown in calculating the design basis source terms for the gaseous radwaste management system. NuScale had specified that the increased source term that could

occur as a result of degasifying through the pressurizer for shutdown was not explicitly modeled.

The staff has determined that the gaseous radwaste system guard and decay beds are expected to be significant radiation sources with significant dose rates. In the current DCD, the room with these beds are radiation zone 5, greater than 100 mrem/hour and less than 1 Rad/hour. Staff review indicates that considering degasifying for shutdown in the source terms could significantly increase the dose rate from these components, likely increasing the radiation zoning in the room and potentially increasing the dose rates and zoning in surrounding areas. Furthermore, based on the current source terms, the gaseous guard bed and decay beds are currently classified as RW-IIb, per the guidance of RG 1.143. The increased source term due to degasification for shutdown could result in the components being re-classified to the higher design classification of RW-IIa.

Key Issues

The applicant does not adequately explain the changes made to the gaseous radioactive waste system component source terms in DCD Tables 12.2-16 and 12.2-17 in the response to RAI 9161, Question 11.01-1. In addition, the revised gaseous waste management system source terms do not appear to appropriately account for shutdown degasification and the application does not appear to address the effects that shutdown degasification could have on radiation zoning, system design classifications, etc.

Questions

1. Explain the changes in assumptions in the gaseous radwaste system source term calculations between DCD Revision 1 and the response to RAI 9161, Question 11.01-1, that resulted in an overall decrease to the gaseous radioactive waste system source terms provided in DCD Tables 12.2-16 and 12.2-17. The description should be sufficient for the staff to understand why the source term decreased, even though the design basis failed fuel fraction more than doubled. Provide appropriate justification for the changes in assumptions made. Ensure that the DCD is updated to document these changes, if necessary.

2. Please update the DCD to account for increases in the gaseous radioactive waste system source terms due to degasifying for shutdown or provide justification for why the current source terms provided in DCD Tables 12.2-16 and 12.2-17 are adequate. If changes are made to the source terms, revise the DCD as appropriate to account for the change,

including changes to RG 1.143 classifications and radiation zoning, as appropriate.

NuScale Response:

1. One of the revised assumptions related to the gaseous radioactive waste system (GRWS) pertains to the input from the containment evacuation system (CES). Previously, it was assumed 1.2 gpm per module (14.4 gpm or 20,700 gpd) based on a maximum sustained reactor component cooling water (RCCW) leak in to containment. This leak rate was also assumed to have the radioactive content of the primary coolant. Currently, it is assumed that the CES input to the GRWS is 10 gpd per module (120 gpd), to match the input stream to the liquid radioactive waste system (LRWS) for the same waste stream. This reduction in flowrate input to the GRWS is approximately equal to the increase in radioactivity due to the change in the failed fuel fraction.

Additionally, in previous versions of the calculations, no credit was taken for radioactive decay, although daughter product in-growth was accounted for. In the most recent versions of these calculations, credit is taken for radioactive decay, including daughter product in-growth.

Therefore, the reduction in the radionuclide inventory of the GRWS charcoal bed components is due to both a reduction in the assumed input flowrate from the CES and the crediting of radioactive decay within the GRWS charcoal beds.

Another modeling change that has a less pronounced impact of the GRWS radionuclide inventory is the GRWS guard bed was previously credited for filtering halogens entering the GRWS decay beds for design basis source terms. This has been changed such that the collection of halogens in the guard bed does not reduce the amount of halogens in the downstream process entering the GRWS decay beds. Thus, all halogens entering the GRWS are used as the input stream for both the guard bed and decay beds resulting in double counting the halogens collected in the GRWS.

2. In recent large PWR designs, there is one gaseous radwaste system for the reactor. When that reactor is shut down, a large portion of the gaseous inventory of the degassed primary water is processed by the gaseous radwaste system, resulting in a significant change in the radioactivity content in the system. In the NuScale plant, there are twelve much smaller modules being operated at varying points in their cycles, that all share one gaseous radwaste system. Therefore, the radiological content of the system will experience less significant changes, resulting in a more averaged and steady state condition. However, there is a potential for a

transient increase in radioisotopic activity in the GRWS guard bed and decay beds due to an end of operating cycle degasification evolution, such that the activities listed in Table 12.2-16 could be temporarily exceeded. To account for this potential increase in activity in the GRWS after a single module shutdown degasification, the GRWS guard bed and decay bed RG 1.143 safety classification has been increased from RW-IIb to RW-IIa. These revised component safety classifications are listed in Table 3.2-1 and Table 11.3-2.

Because this potential increase in GRWS radiological content is a transient condition, it is not reflected in Table 12.2-16, Table 12.2-17, or in Figure 12.3-2.

In addition, clarifying revisions were made to the footnote of Table 11.2-11 and to Table 12.2-12 to indicate the radionuclide source term entering the LRWS degasifier is assumed to be primary coolant letdown that has been processed through the CVCS mixed bed demineralizer. This assumption is the same for both the normal effluent and the design basis shielding analyses.

Impact on DCA:

FSAR Section 12.2.1.6, FSAR Tables 3.2-1, 11.2-11, 11.3-2, and 12.2-12 have been revised as described in the response above and as shown in the markup provided in this response.

RAI 12.02-32

Table 11.2-11: Degasifier Radiological Content

Isotope	Activity (Ci)
Kr83m	2.3E-01
Kr85m	9.8E-01
Kr85	2.9E+02
Kr87	5.3E-01
Kr88	1.6E+00
Kr89	3.6E-02
Xe131m	3.8E+00
Xe133m	3.5E+00
Xe133	2.6E+02
Xe135m	3.3E-01
Xe135	8.7E+00
Xe137	1.1E-01
Xe138	3.9E-01
Br82	6.5E-03
Br83	3.7E-02
Br84	1.7E-02
Br85	2.1E-03
I129	1.6E-07
I130	5.2E-02
I131	1.3E+00
I132	6.1E-01
I133	2.0E+00
I134	3.6E-01
I135	1.3E+00
Rb86m	1.5E-06
Rb86	9.1E-03
Rb88	1.6E+00
Rb89	7.1E-02
Cs132	1.8E-04
Cs134	1.6E+00
Cs135m	1.2E-03
Cs136	3.3E-01
Cs137	9.6E-01
Cs138	5.7E-01
P32	2.6E-08
Co57	1.9E-10
Sr89	1.2E-03
Sr90	2.6E-04
Sr91	6.0E-04
Sr92	3.2E-04
Y90	6.3E-05
Y91m	3.2E-04
Y91	1.7E-04
Y92	2.7E-04
Y93	1.3E-04

Table 11.2-11: Degasifier Radiological Content (Continued)

Isotope	Activity (Ci)
Zn65	4.0E-03
Zr95	3.1E-03
Ag110m	1.0E-02
W187	2.2E-02
H3	1.3E+02
C14	1.1E-02
Ar41	9.8E+00

Note: The radiological content of the liquid in the degasifier in Table 11.2-14 is primary coolant that has been processed through the CVCS demineralizers. The CVCS demineralizer decontamination factors are provided in Table 11.1-2. ~~For the Reactor Building shielding analysis, the degasifier is conservatively assumed to be filled with primary coolant (see Table 12.2-12).~~

RAI 12.02-32, RAI 12.03-15

Table 12.2-12: Liquid Radioactive Waste System Component Source Term Inputs and Assumptions

Model Parameter	Value
LRWS degasifier	
Contents	primary coolantCVCS letdown (see Table 11.2-111-4)
Geometry	vertical cylinder
Source dimensions	diameter=12′; height=14′
Shield thickness of steel shell	1″
Volume	12,500 gallons
LCW and HCW collection tanks	
Inputs	Table 11.2-3
Geometry	vertical cylinder
Source dimensions	diameter=12′; height=15.13′
Shield thickness of steel shell	0.25″
Volume	12,800 gallons
LRWS oil separator	
Inputs	Table 11.2-3
Geometry	parallelepiped
Source dimensions	length=3′; width=10′; height=4′
Shield thickness of steel shell	0.25″
LCW and HCW granulated activated charcoal (GAC) units	
Decontamination Factors	(from Reference 12.2-2)
• Cr-51	256
• Mn-54	107
• Co-58	13.2
• Co-60	6.7
• Ag-110m	3250
• Antimony	7.1
• Nb-95	639
Geometry	vertical cylinder
Source dimensions of vessel	diameter=3′; height=6′
Shield thickness of steel shell	1.3″
LCW and HCW tubular ultrafiltration (TUF) units	
Decontamination factors	
• All nuclides	2.5
Geometry	vertical cylinder
Source dimensions	diameter=39″; height=47.5″
Shield thickness of steel shell	0.25″
LCW and HCW reverse osmosis (RO) units	
Decontamination factors	
• All nuclides	10
Geometry	vertical cylinder
Source dimensions	diameter=39″; height=47.5″
Shield thickness of steel shell	0.25″

RAI 03.02.01-2, RAI 03.02.01-3, RAI 03.02.02-2, RAI 03.02.02-6, RAI 03.08.02-14, RAI 03.09.02-64, RAI 05.04.02.01-6, RAI 06.02.04-2, RAI 09.01.03-1, RAI 09.02.02-1, RAI 09.02.04-1, RAI 09.02.04-1S1, RAI 09.02.05-1, RAI 09.02.06-1, RAI 09.02.07-4, RAI 09.02.07-5, RAI 09.02.09-2, RAI 09.03.04-5, RAI 09.04.02-1, RAI 09.04.02-1S1, RAI 10.04.07-2, RAI 11.02-1, RAI 12.02-32, RAI 15-17, RAI 15-17S1, RAI 19-14

Table 3.2-1: Classification of Structures, Systems, and Components

SSC (Note 1)	Location	SSC Classification (A1, A2, B1, B2)	RTNSS Category (A,B,C,D,E)	QA Program Applicability (Note 2)	Augmented Design Requirements (Note 3)	Quality Group / Safety Classification (Ref RG 1.26 or RG 1.143) (Note 4)	Seismic Classification (Ref. RG 1.29 or RG 1.143) (Note 5)
CNTS, Containment System							
All components (except as listed below)	RXB	A1	N/A	Q	None	B	I
• CVC Injection Check Valve • CVC Discharge Excess Flow Check Valve • CVC PZR Spray Check Valve	RXB	B2	None	AQ-S	None	C	I
• CVC Injection & Discharge Nozzles • CVC PZR Spray Nozzle • CVC PZR Spray CIV • CVC RPV High Point Degasification Nozzle • CVC RPV High Point Degasification CIV • RVV & RRV Trip/Reset # 1 & 2 Nozzles • RVV Trip 1 & 2/Reset #3 Nozzles • CVC Injection & Discharge CIVs	RXB	A1	N/A	Q	None	A	I
• NPM Lifting Lugs • Top Support Structure • Top Support Structure Diagonal Lifting Braces	RXB	B1	None	AQ-S	• ANSI/ANS 57.1-1992 • ASME NOG-1 • NUREG-0554	N/A	I
• CNV Fasteners • Hydraulic skid • CNV Seismic Shear Lug • CNV CRDM Support Frame • Containment Pressure Transducer (Narrow Range) • Containment Water Level Sensors (Radar Transceiver) • SG 1 & 2 Steam Temperature Sensors (RTD)	RXB	A1	N/A	Q	None	N/A	I
CNTS CFDS Piping in containment	RXB	B2	None	AQ-S	None	B	II
Piping from (CES, CFDS, FWS, MSS, and RCCWS) CIVs to disconnect flange (outside containment)	RXB	B2	None	AQ-S	None	D	I
CVCS Piping from CIVs to disconnect flange (outside containment)	RXB	B2	None	AQ-S	None	C	I
CIV Close and Open Position Sensors: • CES, Inboard and Outboard • CFDS, Inboard and Outboard • CVCS, Inboard and Outboard PZR Spray Line • CVCS, Inboard and Outboard RCS Discharge • CVCS, Inboard and Outboard RCS Injection • CVCS, Inboard and Outboard RPV High-Point Degasification • FWS, Supply to SGs and DHR HXs FWIV • RCCWS, Inboard and Outboard Return and Supply • SGS, Steam Supply CIV/MSIVs and CIV/MSIV Bypasses	RXB	B2	None	AQ-S	IEEE 497-2002 with CORR 1	N/A	I
Containment Pressure Transducer (Wide Range)	RXB	B2	None	AQ-S	IEEE 497-2002 with CORR 1	N/A	I
• Containment Air Temperature (RTDs) • FW Temperature Transducers	RXB	B2	None	AQ-S	None	N/A	II
SGS, Steam Generator System							
• SG tubes • Feedwater plenums • Steam plenums	RXB	A1	N/A	Q	None	A	I
• SG tube supports • Upper and lower SG supports	RXB	A1	N/A	Q	None	N/A	I

Table 3.2-1: Classification of Structures, Systems, and Components (Continued)

SSC (Note 1)	Location	SSC Classification (A1, A2, B1, B2)	RTNSS Category (A,B,C,D,E)	QA Program Applicability (Note 2)	Augmented Design Requirements (Note 3)	Quality Group / Safety Classification (Ref RG 1.26 or RG 1.143) (Note 4)	Seismic Classification (Ref. RG 1.29 or RG 1.143) (Note 5)
All other components	RWB, RXB	B2	None	AQ	None	RW-IIc	III
GRWS, Gaseous Radioactive Waste System							
• Charcoal Guard Bed • Charcoal Decay Beds	RWB	B2	None	AQ	None	RW-IIa~~b~~	~~III~~RW-IIa
• Charcoal Drying Heater • Inlet Gas Sampler	RWB	B2	None	None	None	N/A	III
Radiation Indicating Transmitter	RWB	B2	None	AQ	ANSI N13.1-2011	N/A	III
All other components	RWB	B2	None	AQ	None	RW-IIc	III
SRWS, Solid Radioactive Waste System							
Spent Resin Storage Tanks	RWB	B2	None	AQ	None	RW-IIa	RW-IIa
Phase Separator Tanks	RWB	B2	None	AQ	None	RW-IIb	RW-IIb
• Instrumentation • Compactor • In-Line Grab Sampler	RWB	B2	None	None	None	N/A	III
All other components	RWB	B2	None	AQ	None	RW-IIc	III
RWDS, Radioactive Waste Drain System							
All components	RWB, RXB, ANB	B2	None	None	None	D	III
RWBVS, Rad-Waste Building HVAC System							
• Ductwork and Associated Components (Dampers, grilles, etc.) • RXB Exhaust Fan • Instrumentation • RWB Supply Air Handling Unit • RWB Supply Air Fans A/B	RWB	B2	None	AQ	• RG 1.140	N/A	III
All other components	RWB	B2	None	None	None	N/A	III
MAE, Module Assembly Equipment							
• Module Inspection Rack • Module Upender	RXB	B2	None	AQ-S	None	N/A	II
Module Import Trolley	RXB	B2	None	None	None	N/A	III
MAEB, Module Assembly Equipment - Bolting							
RPV Support Stand	RXB	A2	N/A	Q	None	C	I
CNV Support Stand	RXB	B2	None	AQ-S	None	N/A	II
All other components	RXB	B2	None	None	None	N/A	III
FHE, Fuel Handling Equipment							
Fuel Handling Machine	RXB	B2	None	AQ-S	• ANSI/ANS 57.1-1992 • NUREG-0554 • ASME NOG-1	N/A	I
• New Fuel Elevator • New Fuel Jib Crane	RXB	B2	None	AQ-S	None	N/A	II
SFSS, Spent Fuel Storage System							
Spent Fuel Storage Rack	RXB	B2	None	AQ-S	• ANSI/ANS 57.1-1992 • ANSI/ANS 57.2-1983 with additions, clarifications, and exceptions of RG 1.13 • ANSI/ANS 57.3	N/A	I
SFPCS, Spent Fuel Pool Cooling System							
• Pumps • Strainers • Valves - (PCUS boundary isolation valves)	RXB	B2	None	AQ	ANSI/ANS 57.2-1983 with additions, clarifications, and exceptions of RG 1.13	D	III
• Flow control orifices • Instrumentation (pressure, temperature, flow, position)	RXB	B2	None	None	None	N/A	III

RAI 11.02-1, RAI 12.02-32

Table 11.3-2: Major Equipment Design Parameters

Equipment / Parameter	Description / Value
Gas Cooler	
Quantity	2
Type	Double pipe
Design pressure (tube / shell)	15 / 100 psig
Design temperature (tube / shell)	250 / 200°F
Design flow rate (tube / shell)	1.56 scfm / 0.29 gpm
Temperature inlet (tube / shell)	212 / 40 °F
Temperature outlet (tube / shell)	45 / 45 °F
Material	Stainless steel
RG 1.143 safety classification	RW-IIc
Table for Assumed Radioactive Content	Table 11.3-11
Charcoal Guard Bed	
Quantity	1
Type	Cylindrical pressure vessel
Nominal volume	10.2 ft^3
Design pressure	15 psig
Design temperature	250 °F
Design flow rate	1.56 scfm
Material	Stainless steel
RG 1.143 safety classification	RW-IIab
Table for Assumed Radioactive Content	Table 12.2-16
Charcoal Decay Bed Vessel	
Quantity	8 (4 in each of two trains)
Type	Cylindrical pressure vessel
Nominal volume	147 ft^3 per train
Mass of charcoal	4,600 lb per train
Design pressure	15 psig
Design temperature	250 °F
Design flow rate	1.56 scfm
Material	Stainless steel
RG 1.143 safety classification	RW-IIab
Table for Assumed Radioactive Content	Table 12.2-16
Moisture Separator	
Quantity	2
Type	Vertical cylinder
Nominal volume	1 gallon
Design pressure	15 psig
Design temperature	250 °F
Material	Stainless steel
RG 1.143 safety classification	RW-IIc
Table for Assumed Radioactive Content	Table 11.3-11
Charcoal Drying Heater	
Quantity	1
Type	Electric
Duty	0.5 KW
Design flow rate	76 lb/hr / 16 scfm (nitrogen)
Temperature inlet	60 °F
Temperature outlet	150 °F

RAI 12.02-32

The radioisotopic inventory listed in Table 12.2-16 for the GRWS guard bed and decay beds results in a RG 1.143 safety classification of RW-IIb. Because an end of operating cycle degasification evolution could result in a transient radioisotopic inventory that exceeds that listed in Table 12.2-16, the RG 1.143 safety classifications for the GRWS guard bed and decay beds are increased from RW-IIb to RW-IIa to cover such transients, as reflected in Table 11.3-2.

12.2.1.7 Solid Radioactive Waste System

RAI 12.02-2, RAI 12.03-4

The solid radioactive waste system (SRWS) handles solid radioactive waste from various waste streams, as described in Section 11.4. The waste inputs to the SRWS components are collected, resulting in a radionuclide source term for the SRWS components. The assumed values used to develop the SRWS component source terms are listed in Table 12.2-18. Table 12.2-19 lists the radionuclide inventory of the major SRWS components and Table 12.2-20 lists the SRWS component source strengths. As described in Section 11.4, there is storage space provided in the Radioactive Waste Building for processed waste packages that contain spent filters, dewatered resins, and other solid wastes. For shielding design purposes, it is assumed that the Class A/B/C high integrity container storage area contains five high integrity containers loaded with Class B/C dewatered spent resins from the spent resin storage tank, which has been decayed for approximately two years (one fuel cycle), and one 55-gallon drum filled with waste from the LRWS drum dryer. Table 12.2-13b provides the radionuclide inventory of the drum dryer and Table 12.2-14b provides the drum dryer source strength. Storage areas are shielded to limit the radiation level to be compliant with the designated radiation zone.

12.2.1.8 Reactor Pool Water

RAI 12.02-6, RAI 12.02-6S1, RAI 12.02-14

The reactor pool is housed within the RXB and contains up to 12 NPMs, which are partially immersed in the reactor pool water. Because the spent fuel pool communicates with the reactor pool through the weir wall, radionuclides are mixed with the spent fuel pool water volume. There are two sources of radioactive material considered for the reactor pool water: primary coolant released during refueling outages and direct neutron activation. Because of the low power and low temperatures in the spent fuel pool, the radionuclide contribution to the pool water from defective fuel assemblies in the storage racks is considered negligible. The primary source of radionuclides in the reactor pool comes from the primary coolant system when an NPM is disassembled in the reactor pool during outages. During refueling outages, after the primary coolant is cleaned by the CVCS, the small remaining quantities of radionuclides are released into the pool water during NPM disassembly. The post-crud burst cleanup of the primary coolant in the NPM by CVCS will operate until the projected dose rate (after NPM disassembly) to an operator on the refueling bridge is less than 2.5 mR/hr. The other major input assumptions for the pool water source term are provided in Table 12.2-9.