US-APWR DCD Tier 1 Enhancement Project

Tuesday 3/15 PM Handout 1

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3.0 INTERFACE REQUIREMENTS

3.1 Design Description

This section identifies the safety significant ~~interfaces~~interface requirements between the US-APWR standard plant design and the ~~Combined License (COL) applicant~~site-specific design. A

The US-APWR standard plant design consists of several buildings (reactor building including the prestressed concrete containment vessel and containment internal structure, power source buildings, auxiliary building, turbine building and access building); and the systems and equipment located in those buildings~~,~~. ~~and~~ For some systems included in the standard plant design, the associated ~~structures~~structure (e.g., the power source fuel storage vaults and essential service water pipe tunnel) is a site-specific structure. As allowed by the regulations, conceptual designs for systems that are not part of the US-APWR standard plant design are included in the DCD for the ~~purposes~~purpose of allowing the NRC to evaluate the overall acceptability of the standard plant design. However, the final details of these conceptual designs are subject to change due to site-specific conditions. B

Although ~~the system~~ descriptions of the power source fuel storage vaults (PSFSVs) and the essential service water pipe tunnel (ESWPT) are ~~within the scope of~~ provided in this DCD ~~the US-APWR standard design~~, the structural design of the PSFSVs and ESWPT, including seismic and dynamic qualification as applicable, are to be finalized based on the site-specific arrangement. C

An interface requirement as specified in this section ~~is the~~applies to a system, a portion of a system, or a structure that must be added or connected to the standard plant design ~~package~~ to complete the design of the US-APWR at a specific site. D

A COL applicant referencing the US-APWR certified design is responsible ~~to assure that the~~ for site-specific ~~design~~designs that ~~meets~~meet the interface ~~requirement~~requirements and for ~~verify~~verifying that the as-built structures, systems, and components ~~conformance~~conform to the site-specific designs ~~in the~~using an ITAAC process that is similar to ~~those~~that provided ~~in~~for the certified design. E

3.2 Interface Requirements

3.2.1 Ultimate Heat Sink

Ultimate heat sink (UHS) is a safety-related system and is site-specific. The following are site-specific interface requirements: F

a. The UHS system design is consistent with essential service water system (ESWS) divisional separation and is capable of performing its safety functions under design basis event conditions and coincident single failure with or without offsite power available. G

~~a.~~b. The safety related, pressure retaining components, and their supports, are designed, constructed and inspected in accordance with ASME Code Section III, if applicable to the site-specific design. H I

~~b.~~c. The maximum supply water temperature is 95 °F under the peak heat loads condition to provide sufficient cooling capacity to ESWS.

~~c.~~d. The UHS ~~keeps the~~ water level is maintained such that~~at a~~ available net positive suction head (NPSH) is greater than the ESW pump's required NPSH during all plant operating conditions including normal plant operations, abnormal and accident conditions. The ESW pump operation does not cause vortex formation. J

e. The UHS system has main control room (MCR) and remote shutdown console (RSC) alarms and displays for UHS water level and water temperature. K

f. The UHS system has MCR and RSC controls for UHS components' active safety functions if applicable to the site-specific design. F

g. UHS components that have protection and safety monitoring system (PSMS) control (if applicable to the site-specific design) perform an active safety function after receiving a signal from PSMS. K1

h. The UHS can provide the required cooling for a minimum of 30 days without make-up during all plant operating conditions including normal plant operations, abnormal and accident conditions. L M

i. The UHS system is designed to prevent water hammer. N

3.2.2 Fire Protection System

Portions of the fire protection system are site specific. The following is the site-specific interface requirement: O

a. The seismic standpipe system can be supplied from a ~~safety-related~~ seismic Category I water source ~~which~~with a capacity ~~is~~of at least 18,000 gallons. P

b. The fire protection system water supply is from two separate, reliable freshwater sources; or from one freshwater lake or pond of sufficient size with two separate and independent suctions in one or more intake structure(s). AA

3.2.3 Essential Service Water System Q

Portions of the ESWS are site specific due to its dependence on the site-specific UHS system. The following are the site-specific interface requirements:

a. The ESWS piping in the ESWPT that connects to the UHS system is designed, constructed and inspected in accordance with ASME Code Section III. R

b. System layout of the ESWS and UHS system is verified to assure that the pressures in the ESWS and UHS system are above saturation conditions during all plant operating conditions including normal plant operations, abnormal and accident conditions. S

c. The sum of the ESW pump shutoff head and static head is such that the ESW system design pressure is not exceeded. T

d. The discharge location of the ESWP discharge strainer backwash piping is determined according to the type of UHS used. U

e. The ESWS is designed to prevent water hammer. V

~~a.~~f. The ESWS can provide cooling water required for the component cooling water (CCW) heat exchangers and the essential chiller units of the essential chilled water system (ECWS) during all plant operating conditions, including normal plant operations, abnormal and accident conditions. W X

~~3.2.3~~3.2.4 Electrical System

The offsite power system and components are site-specific. The following features are ~~important~~ site-specific interface requirements: Y

a. The electrical system has a minimum of two independent offsite transmission circuits from the transmission network (TN) to the safety buses with no intervening non-safety buses (direct connection).

b. The offsite TN voltage variations during steady state operation do not cause voltage variations beyond an acceptable tolerance of the loads' nominal ratings.

c. The offsite TN normal steady state frequency ~~shall be~~is within an acceptable tolerance of 60Hz during recoverable periods of instability. Y

d. The offsite transmission circuits have the capacity and capability to power the required loads during steady state, transient, and postulated events and accident conditions.

e. There is physical separation and electrical independence between the offsite circuits and onsite class 1E electrical system and components.

f. Lightning protection and grounding features exist for the systems and components of the offsite circuits from the TN to the safety buses.

g. The electrical system has alarms and displays for monitoring the switchyard status.

h. The electrical system has the capability to automatically fast transfer from the preferred power supply to the non-preferred power supply.

i. The switchyard agreement and protocols between the ~~NPP~~nuclear power plant and the TN owner/operator assess the risk and probability of a loss of offsite power due to performing maintenance activities on the electrical system. Y

j. The electrical system ~~design~~ is designed to minimize ~~assesses~~ the probability of losing electric power ~~during~~ from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear unit, the loss of power from the TN, or the loss of ~~the largest load~~power from the onsite electric power supplies. Z

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 3.0

Item No.	Explanation/Basis for Change
3.1 Design Description	
A	Revised to clarify that this section identifies interface requirements that are between the standard plant design and the site-specific design.
B	Revised to clarify the standard plant design and one of the relationships between the standard plant design and the site-specific designs for the US-APWR.
C	Revised to clarify the treatment of the PSFSVs and ESWPT in the DCD. Identified these acronyms. This change alters the response to RAI 220-2058, Question 03.04.01-1 in UAP-HF-09152.
D	Revised to clarify how interface requirements for the standard plant design apply to site-specific design.
E	Revised to clarify the intent to use plant-specific ITAAC to confirm that site-specific designs meet interface requirements. This change alters the response to RAI 424-3281, Question 14.03.06-15 in UAP-HF-09441.
3.2.1 Ultimate Heat Sink	
F	Revised to expand the interface requirements for the UHS. See the response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191.
G	Revised to expand the interface requirements for the UHS. See the response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191. This change alters the response by making “safety function” plural and identifying the acronym ESWS.
H	Revised to expand the interface requirements for the UHS. See the response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191. This change alters the response by clarifying that supports are not pressure retaining components and that pressure retaining components may not be applicable for all UHS designs, e.g., UHS structures on oceans, lakes, or rivers.
I	The response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191 had added an external hazards (seismic, wind, etc.) interface requirement for the UHS system. This change alters that response to not include this as an interface requirement because this requirement is redundant with the first interface requirement for the UHS, Item a, which requires the UHS to perform its safety functions under design basis event conditions.
J	Revised to clarify the minimum cooling water level interface requirements for the UHS. See the response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191. Also see the response to RAI 585-4464, Question 09.02.01-38 in UAP-HF-10256. This change alters these responses due to editorial changes made for clarity and consistency in Tier 1 for describing plant operating conditions including normal plant operations, abnormal and accident conditions.
K	Revised to expand the interface requirements for the UHS. See the response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191. This change alters the response by identifying each new acronym used.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 3.0

Item No.	Explanation/Basis for Change
K1	Revised to expand the interface requirements for the UHS. See the response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191. Also see the responses to RAI 585-4464 in UAP-HF-10256 which revised the initial wording. This change alters the initial response further by identifying the new acronym used.
L	Revised to expand the interface requirements for the UHS. See the response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191. This change alters the response by clarifying the requirement to provide cooling for the unit.
M	The response to RAI 286-2145, Question 09.02.05-1 in UAP-HF-10191 had added a periodic inspection and testing interface requirement for the UHS system. This change alters that response to not include this as an interface requirement because this design feature is not required to be verified by ITAAC per SRP 14.3.6. This ITAAC would be extremely difficult to close due to the lack of verifiable, unambiguous acceptance criteria.
N	Revised to expand the interface requirements for the UHS. See the response to RAI 585-4464, Question 09.02.01-36(a) in UAP-HF-10256. This change alters the response by clarifying that the design is to address and prevent water hammer for the UHS system. Also, moved the corresponding interface requirement for the ESWS to Section 3.2.3.
3.2.2 Fire Protection System	
O	Formatting and editorial changes made for consistency with other subsections of Section 3.0.
P	Revised to clarify the interface requirement for the FPS regarding the classification of the water source needed for the seismic Category I standpipe system in the FPS to be consistent with Regulatory Guide 1.189, Rev.2, Regulatory Position C.3.2.1f.vi.
AA	Requirement on fire protection system water source, based on Regulatory Guide 1.189, Rev.2, Regulatory Position C.3.2.1 e, has been shifted from Tier 1 Section 2.7.6.9 to this section because it is a COL item.
3.2.3 Essential Service Water System	
Q	Added interface requirements for the ESWS. These changes were added by the responses to questions in RAI 585-4464 in UAP-HF-10256. This change alters the responses with minor edits for clarity.
R	Added interface requirements for the ESWS. This change was added by the response to RAI 585-4464, Question 09.02.01-33f in UAP-HF-10256. This change alters the response by not including "…and Section XI" because accessibility for ISI should not be addressed in an ITAAC per SRP Section 14.3, Appendix C.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 3.0

Item No.	Explanation/Basis for Change
S	Added interface requirements for the ESWS. This change was added by the response to RAI 585-4464, Question 09.02.01-36(a) in UAP-HF-10256. This change alters the response by not including "Operating procedures are developed and …" because procedural development is not required to be verified by ITAAC per SRP Section 14.3.6. Edited the response to clarify that *pressures* in both systems need to be above saturation conditions. Also revised the response due to editorial changes made for clarity and consistency in Tier 1 for describing plant operating conditions including normal plant operations, abnormal and accident conditions.
T	Added interface requirements for the ESWS. This change was added by the response to RAI 585-4464, Question 09.02.01-39 in UAP-HF-10256.
U	Added interface requirements for the ESWS. This change was added by the response to RAI 585-4464, Question 09.02.01-52 in UAP-HF-10256.
V	Added interface requirements for the ESWS. See the response to RAI 585-4464, Question 09.02.01-36(a) in UAP-HF-10256. This change alters the response by moving the interface requirement for design to prevent water hammer in the ESWS from Section 3.2.1 for UHS to this section for ESWS.
W	Added interface requirements for the ESWS. The design commitment from Tier 1, Table 2.7.3.1-5, Item 7, was used as the basis for an interface requirement for the site-specific portion of the ESWS. This will ensure that cooling water supply temperature can provide adequate heat removal capacity for the ESWS. The supply temperature depends on UHS system which is a site specific design.
3.2.4 Electrical System	
X	Renumbered due to the addition of interface requirements for the ESWS. This change was added by the responses to questions in RAI 585-4464 in UAP-HF-10256.
Y	Editorial changes made for clarity. These changes alter the response to RAI 424-3281, Question 14.03.06-15 in UAP-HF-09441.
Z	Clarified the interface requirement regarding the loss of the largest load which should be described as the loss of power from the onsite electric power supplies. This change alters the response to RAI 424-3281, Question 14.03.06-15 in UAP-HF-09441.

2.7.4 Radwaste Systems

2.7.4.1 Liquid Waste Management System (LWMS)

2.7.4.1.1 Design Description

~~**System Purpose and Functions**~~

The LWMS is a non safety-related system. The reactor coolant drain tank and the containment vessel sump discharge piping penetrate the PCCV pressure boundary and include ~~a~~ safety-related containment isolation ~~function~~ valves as described in Section 2.11.2. The LWMS ~~is designed to safely~~ monitors, controls, collects, processes, handles, stores, and disposes of liquid radioactive waste generated ~~as a result of~~ during normal operation, including anticipated operational occurrences (AOOs). ~~–~~The LWMS ensures that liquid waste releases comply with 10 CFR 20, Appendix B, Table 2, effluent concentration and dose limits, and 10 CFR 50, Appendix I dose objectives for liquid effluents. A B

~~**Location and Functional Arrangement**~~

The LWMS is located in the containment, the auxiliary building (A/B), and the reactor building (R/B). C

~~**Key Design Features**~~

The LWMS ~~has different~~ subsystems ~~so that the~~ separately process liquid wastes from various sources ~~can be segregated and processed separately~~ in the most appropriate manner for ~~the~~ each type of waste. These subsystems are interconnected ~~in order~~ to provide ~~additional~~ processing flexibility ~~in processing the wastes~~ and ~~to provide~~ redundancy. D

The LWMS subsystems include~~s the following~~: D

- ~~The e~~Equipment and floor drain ~~processing~~ subsystem
- ~~The d~~Detergent drain subsystem
- ~~The c~~Chemical drain subsystem
- ~~The r~~Reactor coolant drain subsystem

The LWMS ~~provides the capability to~~ segregates, collects, and treats ~~the~~ liquid waste using ion exchanger columns and filters to reduce radioactivity to levels acceptable for release or ~~recycle specifications for plant~~ re-use. ~~The LWMS also provides the capability to store, sample, and analyze treated liquid for safe control and disposal.~~ E F

1. The functional arrangement of the LWMS is as described in the Design Description of Subsection 2.7.4.1.1 and Table 2.7.4.1-2. G

2. Upon receipt of a high radiation signal above the pre-determined setpoint, the LWMS discharge valves close automatically. H

3. Deleted. I

4. Deleted. J

5. Deleted.

6. LWMS filters and demineralizers identified in Table 2.7.4.1-2 have the capacity to maintain radioactivity releases within regulatory limits. K

7. Alarm from the liquid radwaste discharge radiation monitor is provided in the MCR. L

~~Tanks, equipment, pumps, etc., used for storing and processing radioactive material are located in controlled areas and shielded in accordance with their design basis source term inventories. After the waste has been processed, it is temporarily stored in monitor tanks where it is sampled prior to recycle or discharge. Connections are provided to forward liquid waste to contracted mobile systems or temporary equipment.~~ M

~~LWMS is designed in compliance with the as low as reasonable achievable (ALARA) principle.~~

~~The LWMS is designed to provide containment isolation of the LWMS lines penetrating containment.~~ N

~~**Seismic and ASME Code Classifications**~~

~~The seismic and ASME code classifications of the containment isolation components of the reactor coolant drain tank and the containment vessel sump are described in Table 2.11.2-1. The portions of the auxiliary building (A/B) that house the principal LWMS equipment are designed to seismic Category II. The LWMS is a non-safety system and the components are non-seismic.~~ O

~~**System Operation**~~

~~The LWMS is designed to process liquid waste generated from normal operation. Treated effluent is normally recycled for plant use. In the event that there is excess water, or that the treated effluent does not meet recycled water quality specifications, the water is discharged after sampling and analysis. The discharge valve is under supervisory control and requires approval to open for discharge.~~ P

~~**Alarms, Displays, and Controls**~~

~~A radiation monitor and dual isolation valves are installed on the sole discharge line to monitor and control effluents to the environment. Detection of radioactivity levels in the stream exceeding the predetermined setpoint automatically closes the discharge valves.~~ Q

~~**Logic**~~

~~The containment isolation logic for the reactor coolant drain tank and the containment vessel sump is consistent with Subsection 2.11.2.~~ R

~~**Interlocks**~~

~~There are no interlocks needed for direct safety functions related to the LWMS.~~ S

~~**Class 1E Electrical Power Sources and Divisions**~~

~~Not applicable.~~

~~**Equipment to be Qualified for Harsh Environments**~~

~~The safety related LWMS equipment to be qualified for harsh environments is identified in Table 2.11.2-1.~~ T

~~**Interface Requirements**~~

~~There are no safety-related interfaces with systems outside of the certified design.~~ U

~~**Numeric Performance Values**~~ U

~~Not applicable.~~

2.7.4.1.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.4.1-1 describes the ITAAC for the LWMS.

The ITAAC associated with the LWMS equipment, components, and piping ~~and~~ that comprise a portion of the CIS are described in Table 2.11.2-2. V

Table 2.7.4.1-1 Liquid Waste Management System Inspections, Tests, Analyses, and Acceptance Criteria

	Design Commitment		Inspections, Tests, Analyses		Acceptance Criteria
1.	The functional arrangement of the LWMS is as described in the Design Description of ~~this~~ Subsection 2.7.4.1.1 and in Table 2.7.4.1-2.	1.	Inspection~~s~~ of the as-built LWMS ~~system~~ will be performed.	1.	The as-built LWMS conforms ~~with~~ to the functional arrangement as described in the Design Description of ~~this~~ Subsection 2.7.4.1.1 and in Table 2.7.4.1-2.
2.	Upon receipt of ~~LWMS effluent discharge isolation~~ a high radiation signal above the pre-determined setpoint, the LWMS ~~effluent~~ discharge valves close automatically.	2.	Tests of the as-built LWMS ~~effluent~~ discharge valves will be performed using a simulated test signal.	2.	Upon receipt of a simulated LWMS high radiation test signal, the as-built LWMS ~~effluent~~ discharge valves close automatically.
3.	~~The ASME components of the LWMS retain their pressure boundary integrity at their design pressure.~~Deleted.	3.	~~A pressure test will be performed on the as-built ASME components of the LWMS required to be hydrostatically examined by the ASME B31.3 as described by Regulatory Guide 1.143.~~Deleted.	3.	~~The results of the pressure test of the as-built ASME components of the LWMS conform with the requirements in the ASME B31.3, as described by Regulatory Guide 1.143.~~ Deleted.
4.	Deleted.	4.	Deleted.	4.	Deleted.
5.	~~The LWMS valves and piping are designed and constructed in accordance with ASME B31.3 requirements.~~ Deleted.	5.a	~~Inspections will be conducted of the fabrication and installation of as-built components.~~ Deleted.	5.a	~~Design documentation exists and concludes that the as-built valves and piping of the LWMS are fabricated, installed, and inspected in accordance with ASME B31.3 requirements.~~ Deleted.
		5.b	~~Analysis will be conducted to reconcile the as-designed and as-built component information with the ASME design documentation.~~ Deleted.	5.b	~~The analysis concludes that the as-built LWMS valves and piping are reconciled with the design documents.~~ Deleted.
6.	LWMS filters and demineralizers identified in Table 2.7.4.1-2 have the capacity to maintain radioactivity releases within regulatory limits.	6.	Inspections will be performed to verify the amount of filtration and ion exchange media loaded in LWMS filters and demineralizer vessels.	6.	The vendor specified filter and ion exchange media for LWMS filters and demineralizers identified in Table 2.7.4.1-2 is loaded in the filter housings and demineralizer vessels.
7.	Alarm from the liquid radwaste discharge radiation monitor is provided in the MCR.	7.	Inspection will be performed for retrievability of the alarm from the liquid radwaste discharge radiation monitor in the as-built MCR.	7.	Alarm from the liquid radwaste discharge radiation monitor can be retrieved in the as-built MCR.

Table 2.7.4.1-2 Liquid Waste Management System Major Component

Component Name	Quantity	Component Location
Equipment and floor drain subsystem		
Waste holdup tanks	4	Auxiliary Building
Waste holdup tank pumps	2	Auxiliary Building
Waste monitor tanks	2	Auxiliary Building
Waste monitor tank pump	2	Auxiliary Building
Waste effluent Inlet filter	2	Auxiliary Building
Waste demineralizer	4	Auxiliary Building
Activated carbon filter	1	Auxiliary Building
Detergent drain subsystem		
Detergent drain tank	1	Auxiliary Building
Detergent drain tank pump	1	Auxiliary Building
Detergent drain monitor tank	1	Auxiliary Building
Detergent drain monitor tank pump	1	Auxiliary Building
Detergent Drain Filter	1	Auxiliary Building
Chemical drain subsystem		
Chemical drain tank	1	Auxiliary Building
Chemical drain tank pump	1	Auxiliary Building
Reactor coolant drain subsystem		
Containment vessel reactor coolant drain tank	1	Containment
Containment vessel reactor coolant drain pumps	2	Containment

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.4.1

Item No.	Explanation/Basis for Change
Design Description 2.7.4.1.1	
A	Edited to improve clarity and technical accuracy..
B	Text added per response to RAI 523, Question 11.02-32 and revised. This change alters the response to RAI 523, Question 11.02-32.
C	Editorial changes made for clarity.
D	Paragraph edited for clarity and reduced verbosity.
E	Edited to improve clarity and technical accuracy.
F	Deleted text redundant with text in the introductory paragraphs.
G	Note 1.
H	Notes 1 and 2. See Item Q.
I	Note 1.
J	Note 1.
K	Note 1. Text added per response to RAI 523, Question 11.02-32 and revised. This change alters the response to RAI 523, Question 11.02-32.
L	Note 1.
M	Deleted text not required per SRP 14.3. This alters the response to RAI 523, Question 11.02-32.
N	Deleted text redundant with text in introductory paragraphs. This change alters the response to RAI 184, Question 14.03.07-27.
O	Deleted text redundant with text in introductory paragraphs. Deleted second sentence in paragraph as the A/B is addressed in Tier 1 Section 2.2.
P	Deleted redundant text and text not required per SRP 14.3.
Q	Notes 1 and 2. See Item H. This change alters the response to RAI 523, Question 11.02-32.
R	Deleted redundant text.
S	Negative statements deleted from the Design Description (DD).
T	Deleted text redundant to information provided in introductory paragraphs and in Section 2.7.4.1.2 regarding the containment isolation function and corresponding ITAAC as described in Section 2.11.2. This change alters the response to RAI 184, Question 14.03.07-24.
U	Negative statements deleted from the Design Description (DD).
V	Editorial change.
ITAAC Table 2.7.4.1-1	
1	DC, ITA, AC Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet.]. [RIS, Standardization, 2nd bullet].
2.	DC– Revised description of signal and valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-23. ITA– Revised description of valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-23. AC – Revised description of signal and valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-23.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.4.1

Item No.	Explanation/Basis for Change
3.	DC, ITA, AC – ITAAC deleted. This design feature is not required to be verified by ITAAC per SRP Section 14.3.3. The LWMS does not include ASME III components. [RIS, Standardization, 4th bullet].
4.	No change.
5.a, b	ITAAC deleted. This design feature is not required to be verified by ITAAC per SRP Section 14.3.3. The LWMS does not include ASME III components. This change does not alter the response to RAI 242, Question 14.03.03-15.
6.	DC, ITA, AC – New ITAAC added (and altered) per response to RAI 523, Question 11.02-32. [RIS p7, Standardization, 2nd bullet]. This change alters the response to RAI 523, Question 11.02-32.
7.	DC, ITA, AC – New ITAAC added to verify that the alarm from the liquid radwaste discharge radiation monitor is provided in the MCR.

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

2.7.4.2 Gaseous Waste Management System (GWMS)

2.7.4.2.1 Design Description

~~**System Purpose and Functions**~~

The GWMS is a ~~not~~non safety-related system. The GWMS ~~is designed to~~ monitors, controls, collects, processes, handles, stores, and disposes of gaseous radioactive waste generated as the result of normal operation, including anticipated operational occurrences (AOOs). The GWMS processes potentially radioactive gases using charcoal beds to remove iodine and create sufficient delay time to allow decay of short half-life radioactive isotopes prior to release. The GWMS ensures that gaseous waste releases comply with 10 CFR Part 20, Appendix B, concentration and dose limits, and 10 CFR Part 50, Appendix I dose objectives for gaseous effluents. The GWMS is located in the auxiliary building (A/B).

The GWMS includes the following components:

- Waste gas surge tanks
- Charcoal beds
- Waste gas compressors
- Waste gas dryer

1. The functional arrangement of the GWMS is as described in the Design Description of Subsection 2.7.4.2.1 and in Table 2.7.4.2-2.

~~**Location and Functional Arrangement**~~

~~The GWMS is located in the A/B. The GWMS uses the gas surge tanks to provide temporary storage of radioactive gas for the decay of the short-lived isotopes that contribute the majority of radioactivity. It also includes the charcoal beds for radioactive gases decay before the gases are released into the environment.~~

~~**Key Design Features**~~

~~The GWMS design provides sufficient capacity and flexibility to collect and process incoming radioactive waste gases for release. Streams in the GWMS are monitored for both hydrogen and oxygen content to prevent flammable mixture. The waste gas compressor packages are used to compress the nitrogen waste gas. The charcoal beds provide adequate delay and decay time before the gases are released into the environment. The radiation level in the treated gases is verified with radiation monitors prior to release to the environment. These radiation monitors send signal to close the GWMS discharge valves upon detection of radiation levels above the set point.~~

~~**Seismic and ASME Code Classifications**~~

~~The portions of the A/B that house the principal GWMS equipment are designed to seismic Category II. The GWMS is a non-safety system and the components are non-seismic.~~ J K

~~**System Operation**~~

~~A gas compressor operates continuously to draw gaseous waste from the holdup tanks, volume control tank and the reactor coolant drain tank and directs the gaseous waste into the gas surge tanks for radioactive decay of short-half-life isotopes. Then the gaseous waste is processed through the dryer, the charcoal bed absorbers, and sent to the plant stack for release to the environment.~~ L

~~**Alarms, Displays, and Controls**~~

2. Upon ~~detection~~ receipt of a high radiation ~~levels~~ signal above the pre-determined setpoint, the ~~GWMS radiation monitor activates an alarm and sends signals to close the~~ GWMS discharge valves close automatically. M

3. Deleted. N

4. Deleted.

5. GWMS charcoal bed columns each contain the design basis volume needed to allow decay of short half-life isotopes to keep releases within regulatory limits. O

6. Alarm from the gaseous radwaste discharge radiation monitor is provided in the MCR. P

~~**Logic**~~ Q

~~There is no logic needed for direct safety functions related to the GWMS.~~

~~**Interlocks**~~

~~There are no interlocks needed for direct safety functions related to the GWMS.~~

~~**Class 1E Electrical Power Sources and Divisions**~~

~~Not applicable.~~

~~**Equipment to be Qualified for Harsh Environments**~~

~~Not applicable.~~

~~**Interface Requirements**~~

~~There are no safety-related interfaces with systems outside of the certified design.~~

~~**Numeric Performance Values**~~

~~Not applicable.~~

2.7.4.2.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.4.2-1 describes the ITAAC for the GWMS.

Table 2.7.4.2-1 Gaseous Waste Management System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the GWMS is as described in the Design Description of ~~this~~ Subsection 2.7.4.2.1 and in Table 2.7.4.2-2.	1. Inspection~~s~~ of the as-built ~~system~~ GWMS will be performed.	1. The as-built GWMS conforms ~~with~~ to the functional arrangement as described in the Design Description of ~~this~~ Subsection 2.7.4.2.1 and in Table 2.7.4.2-2.
2. Upon ~~the~~ receipt of ~~GWMS effluent discharge isolation~~ a high radiation signal above the pre-determined setpoint, the GWMS ~~effluent~~ discharge valves close automatically.	2. Tests of the as-built GWMS ~~effluent~~ discharge valves will be performed using a simulated test signal.	2. Upon ~~the~~ receipt of a simulated GWMS ~~effluent discharge isolation~~ high radiation test signal, the as-built GWMS ~~effluent~~ discharge valves close automatically.
3. ~~The ASME Code components of the GWMS retain their pressure boundary integrity at their design pressure.~~ Deleted..	3. ~~A pressure test will be performed on the as-built ASME code components of the GWMS required to be hydrostatically examined by applicable ASME code.~~Deleted.	3. ~~The results of the pressure test of the as-built ASME Code components of the GWMS conform with the requirements in the applicable ASME Code.~~Deleted.
4. ~~The GWMS valves and piping are designed and constructed in accordance with ASME B31.3 requirements.~~ Deleted.	4.a ~~Inspections will be conducted of the fabrication and installation of as-built components.~~Deleted.	4.a ~~Design documentation exists and concludes that the as-built valves and piping of the GWMS are fabricated, installed, and inspected in accordance with ASME B31.3 requirements.~~Deleted.
	4.b ~~Analysis will be conducted to reconcile the as-designed and as-built component information with the ASME design documentation.~~Deleted.	4.b ~~The analysis concludes that the as-built GWMS valves and piping are reconciled with the design documents.~~Deleted.
5. GWMS charcoal bed columns each contain the volume needed to allow decay of short half-life isotopes to keep releases within regulatory limits.	5. Inspections will be performed to verify the contained volume of each of the charcoal beds.	5. The contained volume in each of the charcoal beds is equal to or greater than 70 ft^3/column.
6. Alarm from the gaseous radwaste discharge radiation monitor is provided in the MCR.	6. Inspection will be performed for the retrievability of the alarm from the gaseous radwaste discharge monitor in the as-built MCR.	6. Alarm from gaseous radwaste discharge radiation monitor can be retrieved in the as-built MCR.

Table 2.7.4.2-2 Gaseous Waste Management System Major Component

Component Name	Quantity	Component Location
Waste gas surge tanks	4	Auxiliary Building
Charcoal beds	4	Auxiliary Building
Waste gas compressors	2	Auxiliary Building
Waste gas dryer	1	Auxiliary Building

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.4.2

Item No.	Explanation/Basis for Change
Design Description 2.7.4.2	
A	Editorial changes made for clarity.
B	Text proposed in RAI 533 Question 11.03-15 is included and revised. This change alters the response to RAI 533, Question 11.03-15.
C	Text revised and relocated to introductory paragraphs. See Item F.
D	Text reformatted, revised, and relocated for consistency within Tier 1. See Items F and G.
E	Note 1.
F	First sentence of paragraph relocated to introductory paragraphs. See Item C. Text reformatted, revised, and relocated for consistency within Tier 1. See Item D.
G	Text reformatted, revised, and relocated for consistency within Tier 1. See Item D.
H	Note 1 and Note 2. See Item O. This change alters the response to RAI 533, Question 11.03-15.
I	Note 1 and Note 2. See Item M.
J	Text deleted as GWMS does not adversely impact any safety-related system thus it does not need to meet seismic Category II criteria.
K	Deleted redundant text to provide consistency within Tier 1.
L	Paragraph deleted as the description is not appropriate for a Tier 1 description.
M	Notes 1 and 2. See Item I.
N	Note 1.
O	Note 1 and Note 2. See Item H. This change alters the response to RAI 533, Question 11.03-15.
P	Note 1.
Q	Negative statements deleted from the Design Description (DD) for consistency within Tier 1.
ITAAC Table 2.7.4.2-1	
1	DC, ITA, AC – Generic changes made to be consistent with functional arrangement ITAAC. [RIS, Scope, 2nd bullet]. [RIS, Standardization, 2nd bullet].
2	DC– Revised description of signal and valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-23. ITA– Revised description of valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. AC – Revised description of signal and valves to be consistent within Tier 1. [RIS, p7, Scope, 1st bullet]. This change alters the response to RAI 184, Question 14.03.07-21.
3	DC, ITA, AC – ITAAC deleted. This design feature is not required to be verified by ITAAC per SRP Section 14.3.3. The GWMS does not include ASME III components. [RIS, Standardization, 4th bullet].
4	DC, ITA, AC – ITAAC deleted. This design feature is not required to be verified by ITAAC per SRP Section 14.3.3. The GWMS does not include ASME III valves and piping. [RIS, Standardization, 4th bullet]. This deletion alters the response to RAI 242 Question 14.03.03-15.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.4.2

Item No.	Explanation/Basis for Change
5	DC, ITA, AC – New ITAAC added (but altered) due to response RAI 533, Question 11.03-15. [RIS, pg 5, Logic, 6th and 7th bullets]. The changes to DC, ITA, and AC alter the response to RAI 533, Question 11.03-15.
6	DC, ITA, AC – New ITAAC added to verify that the alarm from the gaseous radwaste discharge radiation monitor is provided in the MCR.

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

2.7.4.3 Solid Waste Management System (SWMS)

2.7.4.3.1 Design Description

~~**System Purpose and Functions**~~ A

The SWMS is non safety-related system~~. The SWMS is designed to provide collection, processing, packaging, and storage of~~ that collects and temporarily stores radioactive wastes prior to processing or shipment~~produced during normal operation and anticipated operational occurrences (AOOs) including startup, shutdown, and refueling operations~~.

~~**Location and Functional Arrangement**~~

The SWMS is located in the A/B. The SWMS consists of several subsystems, each of which is ~~designed~~ functionally arranged to manage~~handle~~ various solid radioactive waste products, including ~~different types of wastes as follows:~~ spent resin, ~~and~~ spent carbon, spent filter elements, sludge and oily waste, ~~and~~ dry active waste~~s~~, ~~including~~ contaminated clothing, contaminated ~~and/or~~ broken tools and other contaminated ~~maintenance~~ materials.

The SWMS includes two spent resin storage tanks described in Table 2.7.4.3-2. These tanks are used for temporary storage of radwaste prior to dewatering and shipment. B

~~The spent resin and spent carbon handling and dewatering subsystem consists of spent resin storage tanks and a modular dewatering station consisting of a control console, a fillhead, and a dewatering pump.~~ A

~~Spent filter elements are handled with remote handling equipment to minimize worker exposure.~~

~~Sludge and oily wastes are collected in specially designed sumps and are pumped to shipping containers for offsite treatment and/or disposal.~~

~~The dry active wastes are separately collected at the point of generation and are packaged for separate disposal. The onsite wastes storage area is equipped with an overhead crane and an indoor truck bay to load packaged waste for off-site transportation and disposal.~~

~~**Key Design Features**~~

~~The SWMS has the capability of processing, packaging, and storing radioactive wet solid wastes that mainly consist of spent resin, spent activated carbon, oily waste, and sludge.~~

~~The SWMS provides storage of the packaged wastes in the A/B.~~

~~The spent resin storage tanks are cross-connected so that the failure or maintenance of one component does not impair system or plant operation.~~

~~The SWMS is designed with permanently installed equipment and modular equipment.~~

~~**Seismic and ASME Code Classifications**~~

~~The portions of the A/B that house the principal SWMS equipment are designed to seismic Category II. The SWMS is a non-safety system and the components are non seismic.~~ C

~~**System Operation**~~

~~The spent resin storage tanks receive spent resin from various plant sources and provide staging for decay and transfer capability into disposal containers for off-site disposal. The spent charcoal handling subsystem shares the use of the spent resin storage tanks and the resin dewatering equipment. Spent resin, spent charcoal, and spent filter packaging operations are controlled remotely and/or from a local control console for filter replacement and spent resin dewatering. Lubricants and waste solvents drainage is collected in the area sump tanks which are specially designed to provide staging and gravitational oil separation. The separated oils are transferred directly into disposable drums.~~ A

~~**Alarms, Displays, and Controls**~~ D

~~There are no important alarms, displays, and controls.~~

~~**Logic**~~

~~There is no logic needed for direct safety functions related to the SWMS.~~

~~**Interlocks**~~

~~There are no interlocks needed for direct safety functions related to the SWMS.~~

~~**Class 1E Electrical Power Sources and Divisions**~~

~~Not applicable.~~

~~**Equipment to be Qualified for Harsh Environments**~~

~~Not applicable.~~

~~**Interface Requirements**~~

~~There are no safety-related interfaces with systems outside of the certified design.~~

~~**Numeric Performance Values**~~

~~Not applicable.~~

1. The functional arrangement of the SWMS is as described in the Design Description of Subsection 2.7.4.3.1 and in Table 2.7.4.3-2. E

2. DELETED

3. DELETED

4. The SWMS provides the nonsafety-related function of storing radioactive spent resins prior to processing or shipment.

2.7.4.3.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.4.3-1 describes the ITAAC for the SWMS.

Table 2.7.4.3-1 Solid Waste Management System Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the SWMS is as described in the Design Description of ~~this~~ Subsection 2.7.4.3.1 and in Table 2.7.4.3-2.	1. Inspections of the as-built ~~system~~ SWMS will be performed.	1. The as-built SWMS conforms ~~with~~ to the functional arrangement as described in the Design Description of ~~this~~ Subsection 2.7.4.3.1 and in Table 2.7.4.3-2.
~~2. The ASME Code components of the liquid containing portions of the SWMS retain their pressure boundary integrity at their design pressure.~~ 2. DELETED	~~2. A pressure test will be performed on the as-built ASME code components of the liquid containing portions of the SWMS required to be hydrostatically examined by the applicable ASME code.~~	~~2. The results of the pressure test of the as-built ASME Code components of the liquid containing portions of the SWMS conform with the requirements in the applicable ASME code.~~
~~3. The valves and piping of the liquid containing portions of the SWMS are designed and constructed in accordance with ASME B31.3 requirements.~~ 3. DELETED	~~3.a Inspections will be conducted of the fabrication and installation of as-built components.~~	~~3.a Design documentation exists and concludes that the as-built valves and piping of the liquid containing portions of the SWMS are fabricated, installed, and inspected in accordance with ASME B31.3 requirements.~~
	~~3.b Analysis will be conducted to reconcile the as-designed and as-built component information with the ASME design documentation.~~	~~3.b The analysis concludes that the as-built valves and piping of the liquid containing portions of the SWMS are reconciled with the design documents.~~
4. The SWMS provides the nonsafety-related function of storing radioactive spent resins prior to processing or shipment.	4. Inspection will be performed to verify that the volume of each of the spent resin tanks, MTK-001A-N and MTK-001B-N, is at least 800 ft^3.	4. A report exists and concludes that the volume of each of the spent resin tanks, MTK-001A-N and MTK-001B-N, is at least 800 ft^3.

B

Table 2.7.4.3-2 Solid Waste Management System Spent Resin Tanks

Component Name	Tank Type	Tag No.	Component Location
SWMS A-Spent Resin Storage Tank	Cylindrical, Vertical	MTK-001A-N	Auxiliary Building
SWMS B-Spent Resin Storage Tank	Cylindrical, Vertical	MTK-001B-N	Auxiliary Building

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.4.3

Item No.	Explanation/Basis for Change
Design Description 2.7.4.3.1	
A	Revised to clarify and delete text not required for a Tier 1 Design Description.
B	Information on the spent resin tanks was added to the Design Description and to the (new) Table 2.7.4.3-2 to provide a basis for verifying the design attributes for this portion of the solid waste management system (SWMS).
C	This portion of the text deleted from the Design Description wording was added by the response to DCD RAI 187, Question 11.4-6, to specifically address seismic classification of the A/B. However, this design description information is presented in Tier 1, Section 2.2.1.7 and Table 2.2-1, and need not be repeated here.
D	Negative statements deleted from the Design Description (DD) for consistency within Tier 1.
E	Note 1.
ITAAC Table 2.7.4.3-1	
1	Generic changes to ITAAC for functional arrangement made to provide clarity and consistency. [RIS p7, ITAAC Scope, 2nd bullet]
2	ITAAC deleted. SRP Section 14.3.3 requires that ASME Code Section III components have ITAAC. Because the SWMS does not include ASME Section III tanks and pumps, there is not a need for this ITAAC. The SWMS includes only ASME Section VIII, Division 1 and 2 tanks and pumps.
3	ITAAC deleted. SRP Section 14.3.3 requires that ASME Code Section III components have ITAAC. Because the SWMS does not include ASME Section III piping and valves, there is not a need for this ITAAC. The SWMS includes only B31.3 piping and valves.
4	This ITAAC was added to verify the performance of the solid waste management system.
Table 2.7.4.3-2	
	The (new) Table 2.7.4.3-2 was added to provide a basis for verifying the design attributes for this portion of the solid waste management system (SWMS).

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

2.7.6 Auxiliary Systems

2.7.6.1 New Fuel Storage

2.7.6.1.1 Design Description

~~**System Purpose and Functions**~~

The purpose and function of the new fuel storage facilities are to store nuclear `fuel assemblies prior to their being irradiated in the reactor core. The new fuel storage facilities are safety related. The new fuel storage facilities are located in the fuel handling area of the reactor building. The new fuel pit is provided with a drain system, which is connected to the reactor building sump and designed to prevent backflow into the new fuel pit to prevent the new fuel pit from being flooded by an unanticipated release of water. Equipment, including the new fuel pit cover, with a potential to damage the stored fuel is designed to be prevented from collapsing and falling down on the structures in the event of a SSE. A B

1. Deleted. C
2. The functional arrangement of the new fuel storage facilities is as described in the Design Description of Subsection 2.7.6.1.1. D
3. Deleted. E
4. Deleted. F
5. The new fuel storage racks are capable of maintaining new fuel subcritical. G

~~**Location and Functional Arrangement**~~

~~The new fuel storage facilities are located in the fuel handling area of the reactor building. The functional arrangement and design characteristics of the new fuel storage facilities are discussed below.~~ J K

~~**Key Design Features**~~

~~The new fuel storage facilities consist of:~~

- ~~An approximately 18 feet deep dry, unlined reinforced concrete new fuel storage pit.~~ L
- ~~The center-to-center spacing between adjacent fuel assemblies is designed to maintain subcriticality by providing geometrically safe spacing between assemblies to reduce neutron interaction.~~ M

- The new fuel pit is provided with a drain system, which is connected to the reactor building sump and designed to prevent backflow into the new fuel pit to prevent the new fuel pit from being flooded by an unanticipated release of water. N

- The new fuel storage racks maintain subcriticality for all normal and credible abnormal conditions. O

Seismic and ASME Code classifications

New fuel storage racks are evaluated as seismic Category I structures. The new fuel storage pit is designed to maintain its structural integrity following a safe shutdown earthquake (SSE). Equipment, including the new fuel pit cover, with a potential to damage the stored fuel is designed to be prevented from collapsing and falling down on the structures in the event of a SSE. P Q

The requirements of ASME Code Section III, Division I, Article NF3000 are used as the criteria for evaluation of stress analysis. The materials are procured in accordance with ASME Code Section III, Division I, Article NF2000. R

System Operation

There is no important system operation of the new fuel storage facilities. Fuel is moved into and out of the new fuel storage facilities by the light load handling system (LLHS), see Subsection 2.7.6.4. S

Alarms, Displays, and Controls

There are no important alarms, displays, or controls associated with the new fuel storage facilities. T

Logic

There is no logic needed for direct safety functions.

Interlocks

There are no new fuel storage interlocks for direct safety functions.

Class 1E Electrical Power Sources and Divisions

Not applicable.

Equipment to be Qualified for Harsh Environments

Not applicable.

Interface Requirements

There are no interfaces with systems outside the certified design.

~~**Numeric Performance Values**~~

~~Not applicable.~~

2.7.6.1.2 Inspections, Tests, Analyses, and Acceptance Criteria

~~The~~Table 2.7.6.1-1 describes the ITAAC for the new fuel storage facilities.~~are located in Table 2.7.6.1-1.~~ U

Table 2.7.6.1-1 New Fuel Storage Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. Deleted.	1.a Deleted.	1.a Deleted.
	1.b Deleted.	1.b Deleted.
	1.c Deleted.	1.c Deleted.
2. The functional arrangement of the new fuel storage facilities is as described in the Design Description of Subsection 2.7.6.1.1.	2. ~~An i~~Inspection of the as-built new fuel storage facilities will be performed.	2. ~~-~~The as-built new fuel storage facilities conform to the functional arrangement as described in the Design Description of ~~this~~ Subsection 2.7.6.1.1.
3. ~~The new fuel storage facilities meet the ASME requirements as described in the Design Description of Subsection 2.7.6.1.1.~~Deleted.	3. ~~An inspection of the as-built new fuel storage facilities will be performed.~~ Deleted.	3. ~~The as-built new fuel storage facilities meet the ASME requirements described in the Design Description of this Subsection 2.7.6.1.1.~~ Deleted.
4. ~~The new fuel storage racks are located in the reactor building.~~ Deleted.	4. ~~An inspection will be performed to verify that the as-built new fuel storage racks are located in the reactor building.~~ Deleted.	4. ~~The as-built new fuel storage racks are located in the reactor building.~~ Deleted.
5. The new fuel storage racks are capable of maintaining new fuel subcritical.	5.i. Inspections of the as-built new fuel storage racks will be performed.	5.i. The as-built new fuel storage rack dimensions are consistent with the dimensions used in the new fuel storage racks criticality analysis.
	5.ii. Inspections will be performed to verify that the materials of the as-built new fuel storage racks conform to the new fuel storage racks criticality analysis.	5.ii. The materials of the as-built new fuel storage racks conform to the new fuel storage racks criticality analysis.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.1

Item No.	Explanation/Basis for Change
Design Description 2.7.6.1.1	
A	Text relocated to introductory paragraph for clarity and consistency within Tier 1. See Item J.
B	Text relocated to introductory paragraph for clarity and consistency within Tier 1. See Items N and Q. This change alters the response to RAI 132, 09.01.02-4.
C	Note 1.
D	Notes 1 and 2. See Item K.
E	Note 1.
F	Note 1.
G	Notes 1 and 2. See Items M and O. This change alters the response to RAI 132, 09.01.02-15.
J	Text relocated to introductory paragraph for clarity and consistency within Tier 1. See Item A.
K	Notes 1 and 2. See Item D.
L	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance.
M	Notes 1 and 2. See Item G.
N	Text relocated to introductory paragraph for clarity and consistency within Tier 1. See Item B. This change alters the response to RAI 132, 09.01.02-4.
O	Notes 1 and 2. See Item G. This change alters the response to RAI 132, 09.01.02-15.
P	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance. The seismic analysis (MUAP-07033) has been completed and submitted to the NRC.
Q	Text relocated to introductory paragraph for clarity and consistency. See Item B.
R	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance. The stress analysis (MUAP-07033) has been completed and submitted to the NRC.
S	Deleted negative statement from Design Description for consistency within Tier 1; also, text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance.
T	Deleted negative statements from Design Description for consistency within Tier 1.
U	Editorial change for consistency within Tier 1.
ITAAC Table 2.7.6.1-1	
1.	No change.
2.	ITA, AC Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS p8, ITAAC Scope, 2nd bullet]
3.	DC, ITA, AC ITAAC deleted, stress analysis (MUAP-07033) has been completed and submitted to the NRC.
4.	DC, ITA, AC The functional arrangement ITAAC (Item 2 above) is sufficient to verify the location of the new fuel storage facilities as described in the Design Description. Therefore, this redundant ITAAC is deleted. This change alters the response to RAI 132, 09.01.02-15. [RIS p2, ITAAC Format and Content, 2nd bullet]
5.	DC, ITA, AC Added new ITAAC for verifying as-built new fuel storage facilities parameters important to maintaining the new fuel subcritical.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.1

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.

2.7.6.2 Spent Fuel Storage

2.7.6.2.1 Design Description

~~**System Purpose and Functions**~~

The purpose and function of the spent fuel storage facilities are to store nuclear fuel assemblies after they have been irradiated in the reactor core. The spent fuel storage facilities are safety related. The spent fuel storage facilities are located in the fuel handling area of the reactor building. Equipment with the potential to damage the stored fuel is designed to be prevented from collapsing and falling down on the structures in the event of a safe shutdown earthquake (SSE). A

To preclude unanticipated drainage, the SFP is not connected to the equipment drain system. Nozzles or piping connected to the SFP are installed to preclude draining below the allowed water level necessary for spent fuel cooling and radiation shielding. A weir and gate provide physical isolation of the refueling canal from each of the pits. All the gates are located above the top elevation of the fuel seated in the SFP racks; they are normally closed and only opened as required. B C

1. Deleted. D
2. The functional arrangement of the spent fuel storage facilities is as described in the Design Description of Subsection 2.7.6.2.1. E
3. Deleted. F
4. Deleted. G
5. The spent fuel storage racks are capable of maintaining spent fuel subcritical. I

~~**Location and Functional Arrangement**~~

~~The spent fuel storage facilities are located in the fuel handling area of the reactor building. The functional arrangement and design characteristics of the spent fuel storage facilities are discussed below.~~ J K

~~**Key Design Features**~~

~~The spent fuel storage facilities consist of:~~

- ~~A spent fuel pit (SFP) that is approximately 47 feet deep with reinforced concrete walls and floor, lined with stainless steel plate.~~ L
- ~~Spent fuel storage racks that are capable of receiving up to 900 fuel assemblies.~~ M

- The center-to-center spacing between adjacent fuel assemblies is designed to preclude criticality by providing geometrically safe spacing to reduce neutron interaction. N

- A liner leakage collection system is provided to collect possible leakage from liner plate welds on the pit walls and floor. This system is provided with a leak detection capability. O

- The SFP is filled with water that has an initial boron concentration of approximately 4,000 ppm. P

- To preclude unanticipated drainage, the spent fuel pit is not connected to the equipment drain system and the nozzles or piping connected to the SFP are installed to preclude draining below the allowed water level necessary for spent fuel cooling and radiation shielding. Q

- The refueling canal is connected on one side to the SFP, and on its opposite side, the refueling canal connects to the spent fuel cask loading pit and to the fuel inspection pit. A weir and gate provide physical isolation of the refueling canal from each of the pits. All the gates are located above the top elevation of the fuel seated in the SFP racks: they are normally closed and only opened as required. R

- The spent fuel storage racks maintain subcriticality for all normal and credible abnormal conditions. S

Seismic and ASME Code Classifications

Spent fuel storage racks are evaluated as seismic Category I structures. The spent fuel storage pit, including its integrally attached liner, is designed as seismic Category I. The walls of the spent fuel storage pit are an integral part of the seismic Category I reactor building structure. Equipment with the potential to damage the stored fuel is designed to be prevented from collapsing and falling down on the structures in the event of a safe shutdown earthquake (SSE). T U
The requirements of ASME Code Section III, Division I, Article NF3000 are used as the criteria for evaluation of stress analysis. The materials are procured in accordance with ASME Code Section III, Division I, Article NF2000. V

System Operation

There is no “operation” of the spent fuel storage facilities. Fuel is moved into and out of the spent fuel storage facilities by the light load handling system (LLHS) as described in Subsection 2.7.6.4, and the SFP water is purified and cooled by the Spent Fuel Pit Purification and Cooling System as described in Subsection 2.7.6.3. W

Alarms, Displays, and Controls

The SFP liner leakage collection system is provided with a leak detection capability. Instrumentation for SFP level and SFP temperature are addressed in Subsection X Y

~~2.7.6.3. Radiation monitoring associated with the spent fuel storage facilities is addressed in Subsection 2.7.6.13.~~

~~**Logic**~~

~~There is no logic needed for direct safety functions.~~ Z

~~**Interlocks**~~

~~There are no interlocks for direct safety functions.~~

~~**Class 1E Electrical Power Sources and Divisions**~~

~~Not applicable.~~

~~**Equipment to be Qualified for Harsh Environments**~~

~~Not applicable.~~

~~**Interface Requirements**~~

~~There are no interfaces with systems outside the certified design.~~

~~**Numeric Performance Values**~~

~~The postulated fuel handling accident consists of an event in which the cladding of all fuel rods in one assembly is ruptured under a minimum of 23 feet of water. This allows for a decontamination factor (DF) for elemental iodine of 500 and a DF for organic iodine of 1.~~ AA

2.7.6.2.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6.2-1 describes ~~The~~the ITAAC for the spent fuel storage facilities.~~are located in Table 2.7.6.2-1.~~ BB

Table 2.7.6.2-1 Spent Fuel Storage Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. Deleted.	1.a Deleted.	1.a Deleted.
	1.b Deleted.	1.b Deleted.
	1.c Deleted.	1.c Deleted.
2. The functional arrangement of the spent fuel storage facilities is as described in the Design Description of Subsection 2.7.6.2.1.	2. ~~An i~~Inspection of the as-built spent fuel facilities will be performed.	2. ~~-~~The as-built spent fuel storage facilities conform to the functional arrangement as described in the Design Description of ~~this~~ Subsection 2.7.6.2.1.
3. ~~The spent fuel storage facilities meet the ASME requirements as described in the Design Description of Subsection 2.7.6.2.1.~~Deleted.	3. ~~An inspection of the as-built spent fuel facilities will be performed.~~Deleted.	3. ~~The as-built spent fuel storage facilities meet the ASME requirements described in the Design Description of this Subsection 2.7.6.2.1.~~ Deleted.
4. ~~The spent fuel storage racks are located in the reactor building.~~Deleted.	4. ~~An inspection will be performed to verify that the as-built spent fuel storage racks are located in the reactor building.~~ Deleted.	4. ~~The as-built spent fuel storage racks are located in the reactor building.~~ Deleted.
5. The spent fuel storage racks are capable of maintaining spent fuel subcritical.	5.i Inspections of the as-built spent fuel storage racks will be performed.	5.i The as-built spent fuel storage rack dimensions are consistent with the dimensions used in the spent fuel storage racks criticality analysis.
	5.ii Inspections will be performed to verify that the materials of the as-built spent fuel storage racks conform to the spent fuel storage racks criticality analysis.	5.ii The materials of the as-built spent fuel storage racks conform to the spent fuel storage racks criticality analysis.

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.2

Item No.	Explanation/Basis for Change
Design Description 2.7.6.2.1	
A	Text relocated to introductory paragraphs for clarity and consistency within Tier 1. See Item J.
B	Text revised and relocated to introductory paragraphs for clarity and consistency within Tier 1.
C	Text revised and relocated to introductory paragraphs for clarity and consistency within Tier 1. See Items Q and R. This change alters the responses to RAI 88, 19-147 and RAI 132, 09.01.02-7.
D	Note 1.
E	Notes 1 and 2. See Item K.
F	Note 1.
G	Note 1.
H	Not used.
I	Notes 1 and 2. See Items N and S.
J	Text relocated to introductory paragraph for clarity and consistency within Tier 1. See Item A.
K	Notes 1 and 2. See Item E.
L	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance.
M	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance.
N	Notes 1 and 2. See Items I and S.
O	Text deleted as too detailed for Tier 1, not requested by SRP 14.3.
P	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance.
Q	Notes 1 and 2. See Item C. This change alters the responses to RAI 88, 19-147.
R	Notes 1 and 2. See Item C. This change alters the responses to RAI 132, 09.01.02-7.
S	Notes 1 and 2. See Items I and N. This change alters the response to RAI 132, 09.01.02-16.
T	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance. Introductory paragraph already states the spent fuel storage facilities are safety related. This change alters the response to RAI 132, 09.01.02-11.
U	Text relocated to introductory paragraph for clarity and consistency within Tier 1. See Item B.
V	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance. The seismic and stress analyses report (MUAP-07033) has been completed and submitted to the NRC.
W	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance, and negative statements deleted from Tier 1 design descriptions.
X	Text deleted as too detailed for Tier 1, not required by SRP 14.3.
Y	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance. This change alters the response to RAI 132, 09.01.02-14.
Z	Deleted negative statements from Design Description for consistency within Tier 1.
AA	Text deleted as too detailed for Tier 1, not consistent with SRP 14.3 guidance.
BB	Editorial change for consistency within Tier 1. This change alters the response to RAI 132, 09.01.02-1.
ITAAC Table 2.7.6.2-1	

Tier 1 Changes Explanation/Basis Document
Tier 1, Section 2.7.6.2

Item No.	Explanation/Basis for Change
1.	No change.
2.	ITA, AC Generic changes to ITAAC for functional arrangement to provide clarity and consistency. [RIS p8, ITAAC Scope, 2nd bullet]
3.	DC, ITA, AC ITAAC deleted. Stress analysis report (MUAP-07033) has been completed and submitted to the NRC. [OPEN ITEM – MHI to confirm the statement and add the Report #].
4.	DC, ITA, AC The functional arrangement ITAAC is sufficient to verify the location of the spent fuel storage facilities as described in the Design Description. Therefore this redundant ITAAC is deleted. This change alters the response to RAI 132, 09.01.02-16. [RIS p2, ITAAC Format and Content, 2nd bullet]
5.	DC, ITA, AC Added new ITAAC for verifying parameters important to maintaining the spent fuel subcritical.

Note 1: Revised to provide consistency between the Design Description (DD) and the Design Commitment (DC) in the ITAAC table. Revised text to include only the necessary attributes for ITAAC.

Note 2: Text relocated within the DD section to align with the sequence and numbering of the corresponding DC in the ITAAC table.