

ENCLOSURE 2

APP-GW-GLN-116-NS, Revision 0

“Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension”

Technical Report 116

Public Version

## AP1000 DOCUMENT COVER SHEET

TDC: \_\_\_\_\_ Permanent File: \_\_\_\_\_ APY: \_\_\_\_\_

RFS#: \_\_\_\_\_ RFS ITEM #: \_\_\_\_\_

AP1000 DOCUMENT NO. APP-GW-GLN-116- <del>NS</del>	REVISION NO. 0	Page 1 of 30	ASSIGNED TO W-McGinnis
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ALTERNATE DOCUMENT NUMBER: TR116

WORK BREAKDOWN #:

ORIGINATING ORGANIZATION:

TITLE: **Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension**  
**(Security-Related Information Withheld Under 10 CFR 2.390)**

ATTACHMENTS:

DCP #/REV. INCORPORATED IN THIS  
DOCUMENT REVISION:  
APP-GW-GEE-232 Rev. 0

CALCULATION/ANALYSIS REFERENCE:

ELECTRONIC FILENAME	ELECTRONIC FILE FORMAT	ELECTRONIC FILE DESCRIPTION
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\* Approval of the responsible manager signifies that document is complete, all required reviews are complete, electronic file is attached and document is released for use.

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 2 of 30

**Document Number:** APP-GW-GLN-116

**Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

**Brief Description of the change (what is being changed and why):**

In order to increase overall liquid waste holdup capacity and improve operational flexibility with respect to environmental discharges, three additional liquid waste monitor tanks (and associated pumps, piping, instruments, and valves) are incorporated into the liquid radwaste system. The new tanks are 15,000 gallons each, and are identical to and functionally can be used either downstream of or in parallel with the three existing monitor tanks. The new tanks are housed in the radwaste building, which is extended to plant west.

Also, in order to improve handling capability for standard solid radwaste containers within the radwaste building, the doorway between the radwaste building truck bays and the waste accumulation room is changed from a personnel door to a ten-foot wide sliding shield door. This will allow waste containers to be moved through this door with the crane, rather than lifting the container over the wall into the room.

**I. APPLICABILITY DETERMINATION**

This evaluation is prepared to document that the change described above is a departure from Tier 2 information of the AP1000 Design Control Document (DCD) that may be included in plant specific FSARs without prior NRC approval.

A.	Does the proposed change include a change to:		
	1. Tier 1 of the AP1000 Design Control Document APP-GW-GL-700	<input type="checkbox"/> NO <input checked="" type="checkbox"/> YES	(If YES prepare a report for NRC review of the changes)
	2. Tier 2* of the AP1000 Design Control Document, APP-GW-GL-700	<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES	(If YES prepare a report for NRC review of the changes)
	3. Technical Specification in Chapter 16 of the AP1000 Design Control Document, APP-GW-GL-700	<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES	(If YES prepare a report for NRC review of the changes)
B.	Does the proposed change involve:		
	1. Closure of a Combined License Information Item identified in the AP1000 Design Control Document, APP-GW-GL-700	<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES	(If YES prepare a COL item closure report for NRC review.)
	2. Completion of an ITAAC item identified in Tier 1 of the AP1000 Design Control Document, APP-GW-GL-700	<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES	(If YES prepare an ITAAC completion report for NRC review.)

- ☐ The questions above are answered no, therefore the departure from the DCD in a COL application does not require prior NRC review unless review is required by the criteria of 10 CFR Part 52 Appendix D Section VIII B.5.b. or B.5c

**Document Number:** APP-GW-GLN-116

**Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

## **II. TECHNICAL DESCRIPTION AND JUSTIFICATION**

### **a) Addition of Three Liquid Waste Monitor Tanks (3 x 15,000 gallon tanks)**

During recent reviews, prospective combined license applicants referencing the AP1000 design requested a significant increase in liquid radwaste tank capacity. This increased capacity will increase operational flexibility, particularly with respect to scheduling of releases of processed effluents to the environment.

Technical review and comparison with operating experience for various potential plant sites concluded that three additional monitor tank subsystems, each identical to the 15,000 gallon monitor tank subsystems currently included in AP1000 would be adequate to provide the added operational flexibility requested. Each monitor tank subsystem includes an associated pump, piping, valves, and instrumentation, and is located as shown in detail "B" of Figure 116-1.

The additional tanks are located in the radwaste building, which is extended by addition of a bay (approx. 25 x 69 feet) to Plant West as shown in Figure 116-1. The HVAC and electrical equipment rooms which are presently in the west end of the building will be "slid along" so as to maintain their present position relative to the arrangement of the building.

The revised radwaste building room numbering is as shown in Figure 116-2.

Piping to the new tanks is routed through a new shielded pipe trench in the floor of the radwaste building, as shown in detail "C" of Figure 116-1.

The liquid radwaste discharge monitor and isolation valve are relocated from the auxiliary building to the radwaste building. This equipment is located in room 50355 with the new monitor tanks, and the piping is routed to the environment from an initial connection in that room. As discussed in APP-GW-GLN-098 Revision 0 (Reference 1) the effluent discharge piping will be protected against inadvertent leakage to the environment.

### **b) Change of Doorway into Waste Accumulation Room (Room 50353)**

In order to facilitate material movement between the radwaste building mobile systems facility (room 50350) and the waste accumulation room (room 50351) using the radwaste building crane, the doorway at the east end of room 50351 is changed from a double personnel door to a 10-foot wide, 6-inch thick sliding shield door. This change is shown in detail "A" of Figure 116-1.

### **c) References**

1. APP-GW-GLN-098 Revision 0; "AP1000 Compliance with 10CFR20.1406"

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 4 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

SRI



**Figure 116-1 Radwaste Building Modifications**

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 5 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

SRI



**Figure 116-2 Radwaste Building Room Numbering**

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 6 of 30

**Document Number:** APP-GW-GLN-116

**Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

**III. DCD MARK-UP**

In Tier 1, Section 2.3, add the new tanks to Table 2.3.10-5 as shown:

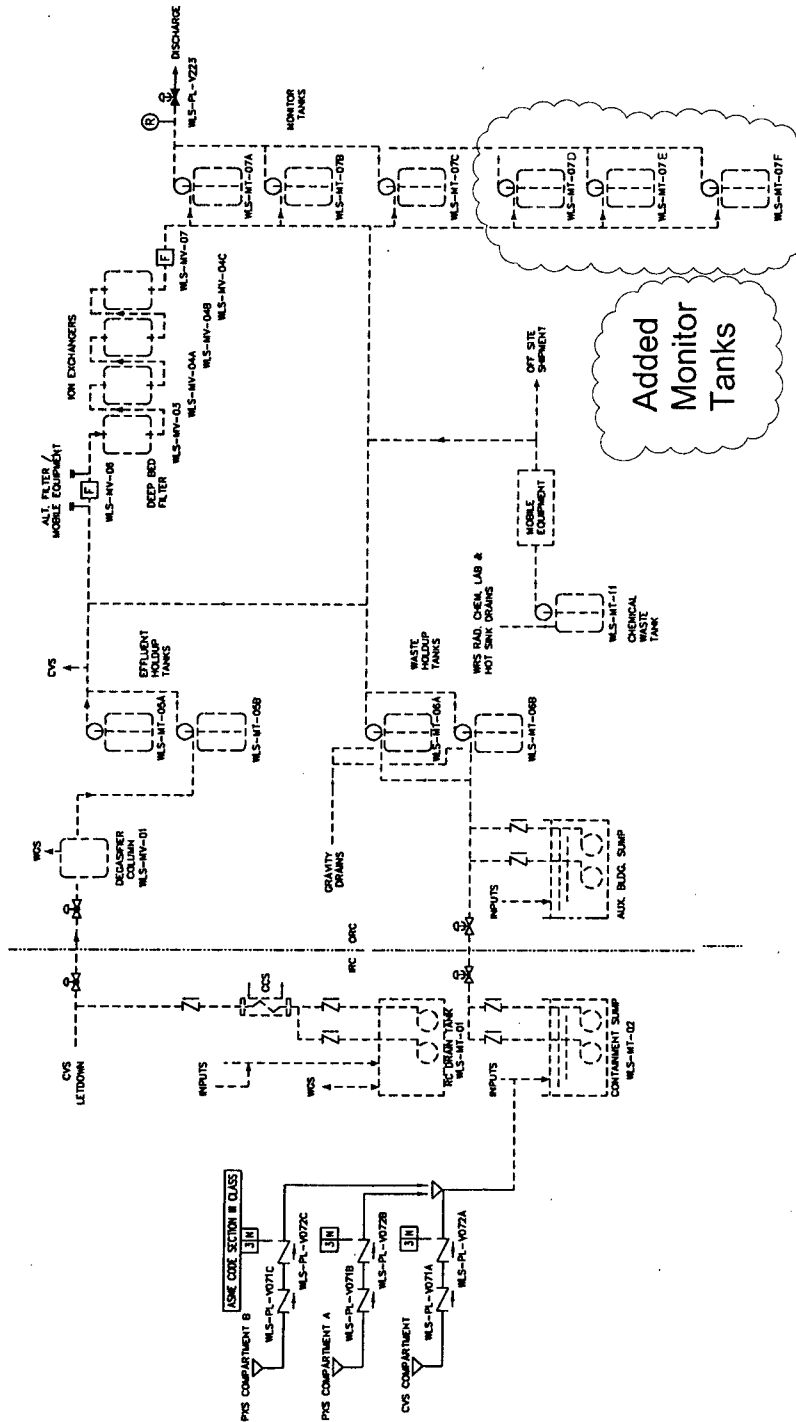
Table 2.3.10-5		
Component Name	Tag No.	Component Location
WLS Reactor Coolant Drain Tank	WLS-MT-01	Containment
WLS Containment Sump	WLS-MT-02	Containment
WLS Degasifier Column	WLS-MV-01	Auxiliary Building
WLS Effluent Holdup Tanks	WLS-MT-05A WLS-MT-05B	Auxiliary Building
WLS Waste Holdup Tanks	WLS-MT-06A WLS-MT-06B	Auxiliary Building
WLS Waste Pre-Filter	WLS-MV-06	Auxiliary Building
WLS Ion Exchangers	WLS-MV-03 WLS-MV-04A WLS-MV-04B WLS-MV-04C	Auxiliary Building
WLS Waste After-Filter	WLS-MV-07	Auxiliary Building
WLS Monitor Tanks	WLS-MT-07A WLS-MT-07B WLS-MT-07C	Auxiliary Building
	WLS-MT-07D WLS-MT-07E WLS-MT-07F	Radwaste Building

Document Number: APP-GW-GLN-116

Revision Number: 0

Title: Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 1, Section 2.3, add the new tanks to Figure 2.3.10-1 as shown:





**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 8 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 1, Table 3.5-7, show the effluent discharge monitor as relocated from the Auxiliary Building to the Radwaste Building.

Table 3.5-7		
Component Name	Tag No.	Component Location
Liquid Radwaste Discharge Monitor	WLS-RE229	Auxiliary Radwaste Building

Revise Tier 2, Section 1.2.7 as follows:

**1.2.7 Radwaste Building**

**Building Function**

The radwaste building includes facilities for segregated storage of various categories of waste prior to processing, for processing by mobile systems, and for storing processed waste in shipping and disposal containers. No safety-related equipment is located in the radwaste building. Dedicated floor areas and trailer parking space for mobile processing systems is provided for the following:

- Contaminated laundry shipping for offsite processing
- Dry waste processing and packaging
- Hazardous/mixed waste shipping for offsite processing
- Chemical waste treatment
- Empty waste container receiving and storage
- Storage and loading packaged wastes for shipment

The radwaste building also provides for temporary storage of other categories of plant wastes.

Three liquid waste monitor tanks are located within the radwaste building. These tanks contain processed effluents which are ready for release to the environment.

**Civil/Structural Features**

The radwaste building general arrangement is shown on Figure 1.2-22. The radwaste building is a nonseismic structure designed in accordance with the Uniform Building Code. The liquid radwaste processing areas are designed to contain any liquid spills. These provisions include a raised perimeter and floor drains that lead to the liquid radwaste system waste holdup tanks. The foundation for the entire building is a reinforced concrete mat on grade.

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 9 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

Revise Tier 2, Section 1.2, Figure 1.2-2 (Site Plan) to show the bay of the radwaste building. This figure will be revised as part of the next revision of the Design Control Document.

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**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 10 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

Revise Tier 2, Section 1.2, Figure 1.2-22 to show the new sliding shield door and new monitor tank room as shown below.

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**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 11 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 2, Appendix 1A, the discussion of Regulatory Guide 1.143 is revised as follows:

Criteria Section	Referenced Criteria	AP1000 Position	Clarification/Summary Description of Exceptions
---------------------	------------------------	--------------------	---

**Reg. Guide 1.143, Rev. 2, 11/01 – Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants**

General

The AP1000 Radwaste Building provides space to store dry active waste, ~~and space for mobile waste processing systems and equipment, and three liquid waste monitor tanks which contain liquid effluents which have been processed and are acceptable for release to the environment (within the requirements of classification RW-IIC of Regulatory Guide 1.143).~~ It does not contain installed systems and components used to process, store, or handle gaseous ~~or liquid~~ waste.

<discussion of C.1.1.1 and C.1.1.2 unchanged>

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 12 of 30

Document Number: APP-GW-GLN-116

Revision Number: 0

Title: Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

Criteria Section	Referenced Criteria	AP1000 Position	Clarification/Summary Description of Exceptions
C.1.1.3		Conforms	<p>The auxiliary building that contains the liquid radwaste system (with the exception of three monitor tanks) is designed to Seismic Category I criteria. The Seismic Category I structure will retain the maximum liquid inventory of the system. The lowest level of the auxiliary building, elevation 66'6", contains the liquid radwaste system effluent holdup tanks, waste holdup tanks, a monitor tank and chemical waste tank within a common flood zone. This flood zone has watertight floors and walls. The enclosed volume within this flood zone is sufficient to contain the contents of the system. The tank rooms each have one or two floor drains that lead to the sump. Tank overflows or spills will be collected in the auxiliary building sump. The sump is automatically pumped to a waste holdup tank. Two liquid radwaste system monitor tanks are three levels up at elevation 100'-0". Overflows or spills from these monitor tanks drain by gravity down through the drain system to a waste holdup tank.</p> <p>The Seismic Category I criteria exceed the operating basis earthquake required by regulatory position C.6 of Regulatory Guide 1.143.</p> <p>The radwaste building that contains three liquid radwaste monitor tanks is designed to the Uniform Building Code. The basemat and curbed structure will retain the maximum liquid inventory of any of the three monitor tanks. Tank overflows or spills will be collected by the radioactive waste drain system and routed to the auxiliary building sump. The sump is automatically pumped to a waste holdup tank.</p> <p>The Uniform Building Code design of the radwaste building meets the requirements of regulatory position C.6 of Regulatory Guide 1.143 for structures classified as RW-IIC.</p>

<discussion of C.1.2.1, C.1.2.2, and C.1.2.3 unchanged>

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 13 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 2, Section 9.3, Table 9.3.3-2, add the sample point for the new monitor tanks to item 18 of the table as shown:

Table 9.3.3-2 (Sheet 2 of 4)

**LOCAL SAMPLE POINT NOT IN THE PRIMARY SAMPLING SYSTEM  
(NORMAL PLANT OPERATIONS)**

<b>Sample Point Name</b>	<b>Available Number of Points</b>	<b>Type of Sample<sup>(a)</sup></b>	<b>Process Measurement</b>
18. WLS monitor tanks MT07A, B, C, <u>D, E,</u> <u>F</u>	3	Grab	Tritium, gross radioactivity and identification and concentration of principal radionuclide and alpha emitters. State and federal environmental discharge requirements such as pH, suspended solids, oil and grease, iron, copper, sodium nitrite

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## Page 14 of 30

Revision Number: 0

In Tier 2, Section 9A, Table 9A-3, add the new rooms as shown:

FIRE PROTECTION SUMMARY											
Fire Area/ Zone <sup>(1)</sup>	Safety Area? <sup>(2)</sup>	Floor Area Sq Ft	Combust. Material <sup>(3)</sup>	Fire Sev. Cat.	Amount	Heat Value (Btu)	Comb. Load, Btu/ Sq Ft	Equiv. Dur. (Min)	Boundary Fire Res. <sup>(4)</sup> (Hours)	Detect. Cap.	Fixed Suppression Capability <sup>(5)</sup>
5031 AF 01	NO								0	SEE ZONE	SEE ZONE
(existing rows unchanged)											
5031 AF 50355			CABLE INS	C	1600	1.6E+07				NONE	HOSE STATION
MONITOR TANK			VOLATILES	E	40	5.4E+06					
ROOM			LUBE OIL	E	5	7.6E+05					
		1210	NET CAT.	E	TOTAL:	2.3E+07	18600	14			
(totals updated)											

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

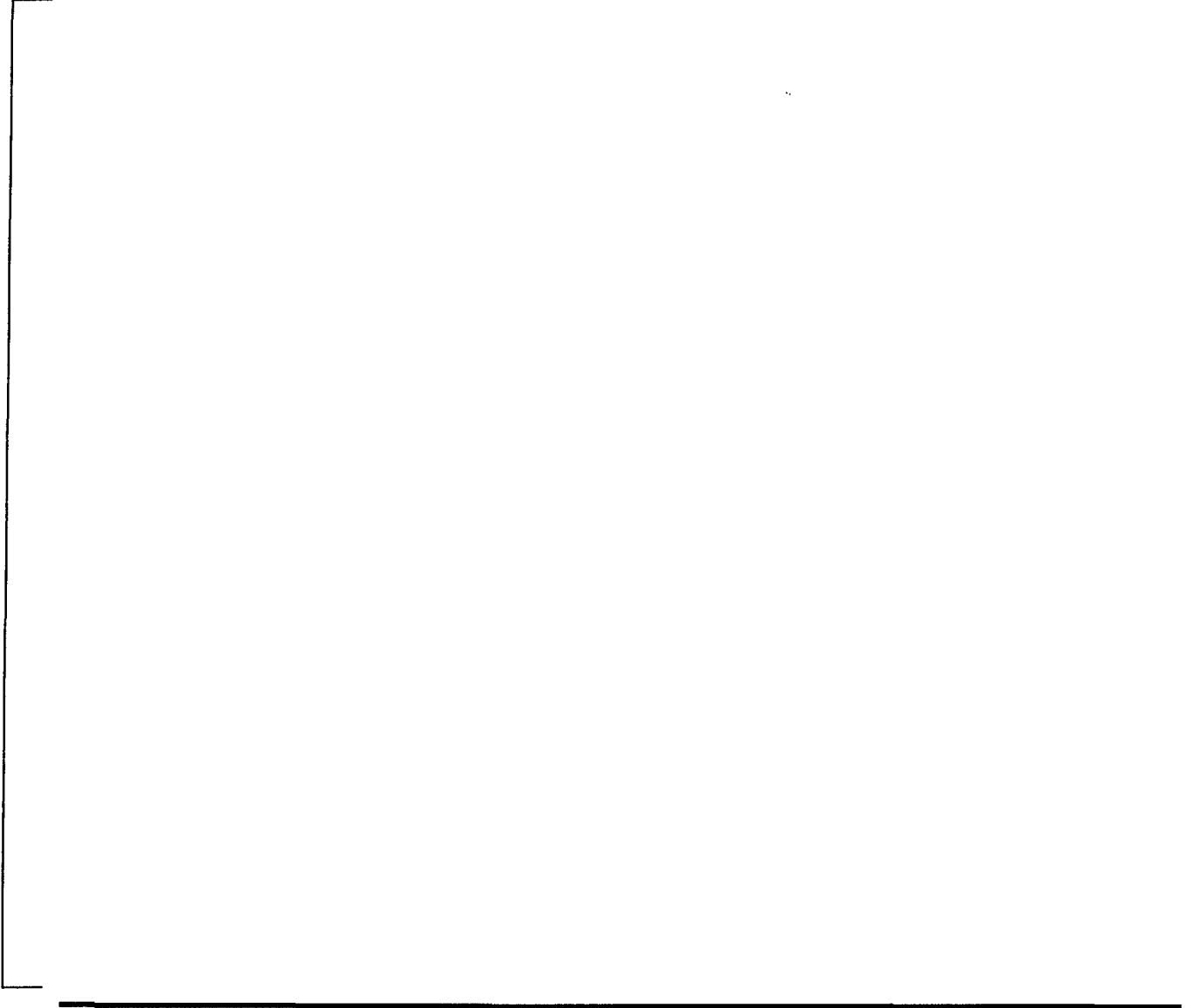
Page 15 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

SRI

In Tier 2, Appendix 9A, add the new monitor tanks room to Figure 9A-4 as shown:





**Document Number:** APP-GW-GLN-116

**Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 2, Section 11.2.1.2.4, add the following to the seventh paragraph of the section. Note that this markup shows the composite of changes from this Technical Report and those made in Reference 1.

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**11.2.1.2.4      Controlled Release of Radioactivity**

<Six paragraphs unchanged>

Provisions are made to control spills of radioactive liquids due to tank overflows. Table 11.2-3 lists the provisions for tank level indication, alarms, and overflow disposition for liquid radwaste system tanks outside containment. In addition, the radioactive waste collection tanks (i.e., the effluent holdup tanks, waste holdup tanks, and chemical waste tank) are located within the auxiliary building, which is well sealed and equipped with an extensive floor drain system. The radwaste monitor tanks are located in the auxiliary building and in the radwaste building, which have well sealed, contiguous basemats with integral curbing and floor drain systems. Routing of both of the auxiliary building and radwaste building floor drain systems are to the liquid radwaste system. This eliminates the potential for undetected tank leakage to the environment, and supports compliance with 10 CFR 20.1406 (Reference 5).

<Section continues>

In Tier 2, Section 11.2.1.2.5.1, add the following phrase:

**11.2.1.2.5.1 Permanently Installed Equipment**

The liquid radwaste system equipment design parameters are provided in Table 11.2-2.

The seismic design classification and safety classification for the liquid radwaste system components and structures are listed in Section 3.2. The components listed are located in the Seismic Category I Nuclear Island and in the radwaste building.

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**Document Number:** APP-GW-GLN-116

**Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 2, Section 11.2.2.1.1, remove the specific number of monitor tanks from the thirteenth paragraph of the section. (Since this information is provided elsewhere, having the specific number does not add value here.)

**11.2.2.1.1      Reactor Coolant System Effluents**

<12 paragraphs unchanged>

After deionization, the water passes through an after-filter where radioactive particulates and resin fines are removed. The processed water then enters one of ~~three~~the monitor tanks. When one of the monitor tanks is full, the system is automatically realigned to route processed water to another tank.

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In Tier 2, Section 11.2.2.3.1, change the number of monitor tanks in the fifth paragraph of the section.

**11.2.2.3.1      Liquid Radwaste System Pumps**

<Four paragraphs unchanged>

**Other Pumps**

The following air-operated double-diaphragm pumps are mounted near the associated tanks with internal suction piping. Construction is of stainless steel, with elastomeric diaphragms.

- Degasifier discharge pumps (2)
  - Effluent holdup tank pumps (2)
  - Waste holdup tank pumps (2)
  - Monitor tank pumps (~~3~~6)
  - Chemical waste tank pump (1)
-

**Document Number:** APP-GW-GLN-116

**Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 2, Section 11.2.2.5.1.3, remove the specific number of monitor tanks in the eleventh paragraph of the section. (Since this information is provided elsewhere, having the specific number does not add value here.)

**11.2.2.5.1.3 Processing of the Reactor Coolant System Effluents**

<Ten paragraphs unchanged>

Process discharge is normally aligned to one of the ~~three~~ monitor tanks. When one of the tanks is full, an alarm alerts the operator that the tank is full and ready to be discharged. The inlet diversion valve automatically realigns the system to route processed waste to another tank upon high-high level.

In Tier 2, Table 11.2-2 Sheet 7, change the number of monitor tanks.

Table 11.2-2 (Sheet 7 of 7)	
COMPONENT DATA – LIQUID RADWASTE SYSTEM	
Monitor tanks	
Number	<u>36</u>
Nominal volume (gal)	15,000
Type	Vertical
Design pressure (psig)	Atmospheric
Design temperature (°F)	150
Material	Stainless steel

**Document Number:** APP-GW-GLN-116

**Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 2, change Table 11.2-3 as shown.

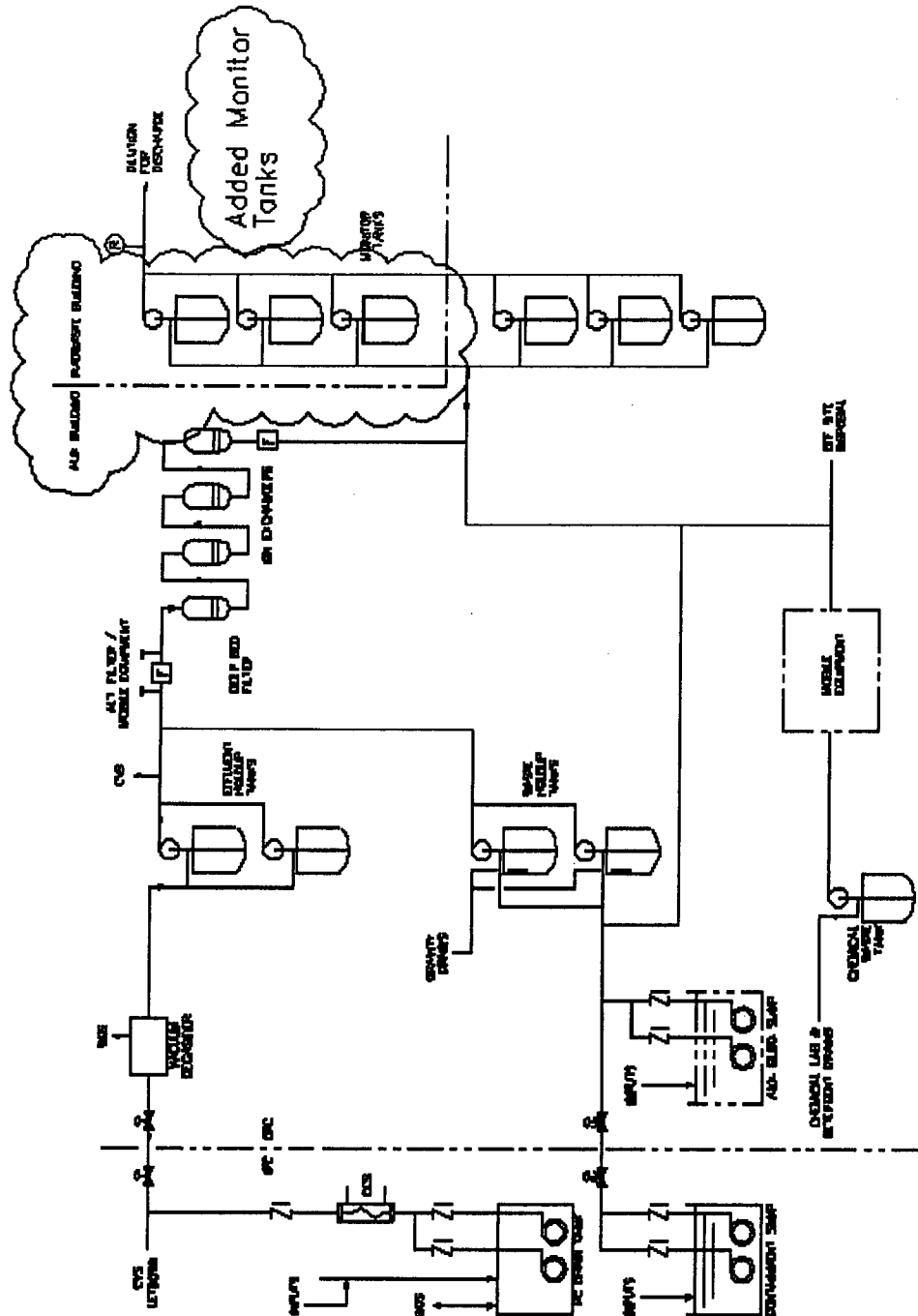
Table 11.2-3				
SUMMARY OF TANK LEVEL INDICATION, LEVEL ANNUNCIATORS, AND OVERFLOWS				
Tank	Level Indication Location (Note 3)	Alarm Location	Alarm	Overflow To
Effluent holdup	MCR	MCR	High	Room drains to auxiliary building sump which is pumped to waste holdup tank (Note 2)
Waste holdup	MCR	MCR	High	Room (Note 42)
Chemical waste	MCR	MCR	High	Room (Note 2)
Monitor	MCR	MCR	High	Room (Note 25)

**Notes:**

1. MCR = main control room
2. Room is piped to a floor drain within the auxiliary building, which is (seismic Category 1) and water-tight with curbs or walls of sufficient height to contain the entire contents of the contained tank.
3. Monitoring of the liquid radwaste system is performed through the data display and processing system. Control functions are performed by the plant control system. Appropriate alarms and displays are available in the control room. Local indication and control are available on portable displays which may be connected to the data display and processing system. See Chapter 7.
4. Room is within the auxiliary building, which is seismic Category 1 and water-tight with curbs or walls of sufficient height to contain the entire contents of the contained tank.
5. Room is piped to a floor drain within the auxiliary building, which is seismic Category 1 and water-tight with curbs or walls of sufficient height to contain the entire contents of the contained tank, or to a floor drain within the radwaste building, which is water tight with curbs or walls of sufficient height to contain the entire contents of the contained tank.

Page 20 of 30Revision Number: 0

In Tier 2, change Figure 11.2-1 as shown.



**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 21 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 2, change Figure 11.2-2 Sheet 5, and add new sheets 8 and 9 to correspond to the revised sheets of the WLS P&ID; see attached figures.

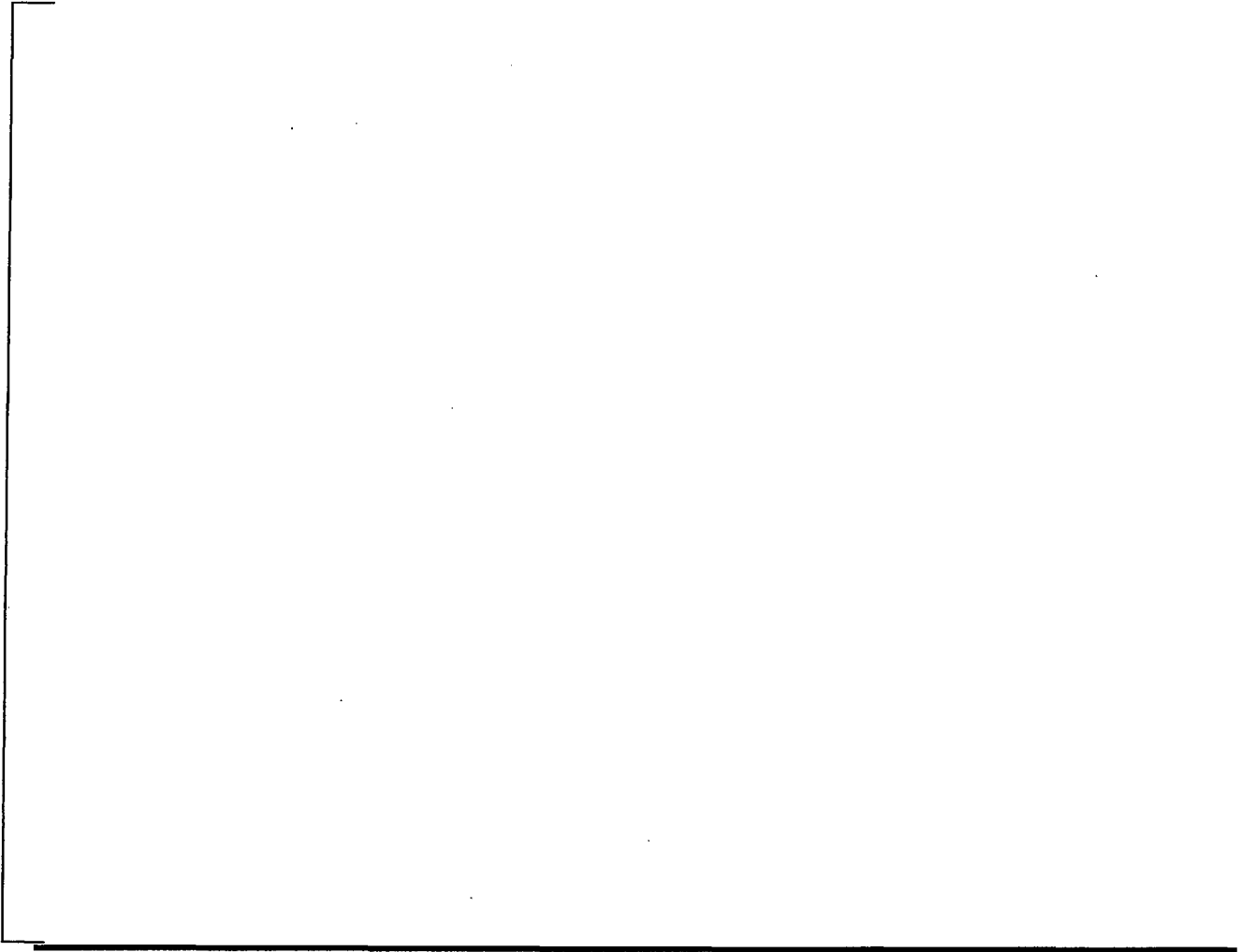
**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 22 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

SRI In Tier 2, Figure 12.3-1 (Sheet 14 of 16), Radiation Zones, Normal Operation/Shutdown Radwaste Bldg EL 100'-0", add the monitor tank room as shown below.



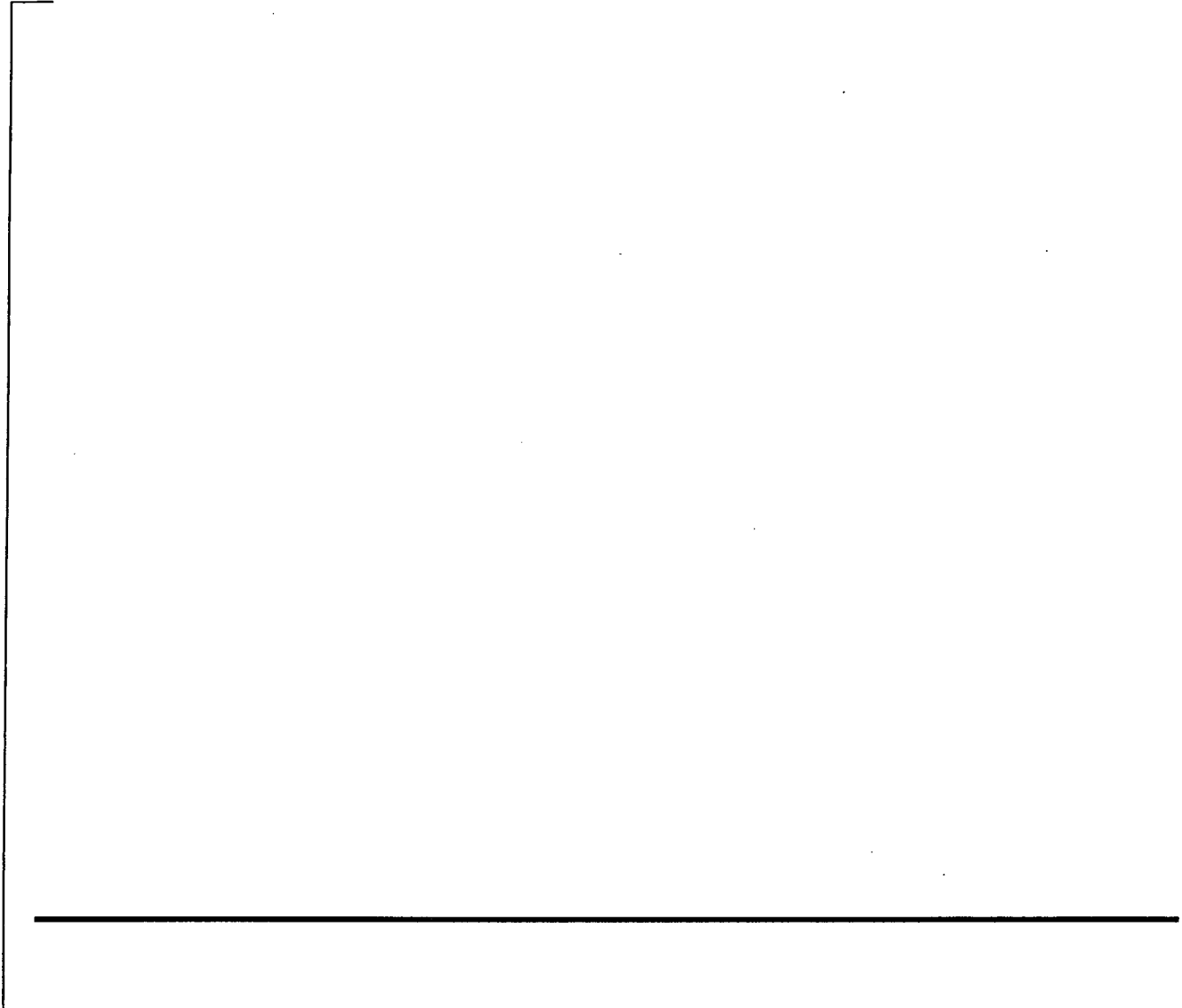
**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 23 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

SRI In Tier 2, Figure 12.3-2 (Sheet 14 of 15), Radiation Zones, Post-Accident Radwaste Bldg EL 100'-0", add the monitor tank room as shown below.





**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 24 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

In Tier 2, Figure 12.3-3 (Sheet 14 of 16), Radiological Access Controls Normal Operation/Shutdown  
SRI Radwaste Bldg EL 100'-0", add the monitor tank room as shown below.



**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

#### **IV. REGULATORY IMPACT**

##### **A. FSER IMPACT**

No changes to the conclusions of the NRC Final Safety Evaluation Report (FSER) (NUREG-1712) are anticipated. However, certain revisions to the text of the FSER may be considered:

- In FSER Section 11.2, the number of monitor tanks is mentioned.
- In FSER Section 11.2, the monitor tanks are mentioned as being in the auxiliary building.

##### **B. SCREENING QUESTIONS (Check correct response and provide justification for that determination under each response)**

1. Does the proposed change involve a change to an SSC that adversely affects a DCD ☐ YES ☒ NO described design function?
2. Does the proposed change involve a change to a procedure that adversely affects how ☐ YES ☒ NO DCD described SSC design functions are performed or controlled?
3. Does the proposed activity involve revising or replacing an DCD described ☐ YES ☒ NO evaluation methodology that is used in establishing the design bases or used in the safety analyses?
4. Does the proposed activity involve a test or experiment not described in the DCD, ☐ YES ☒ NO where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the DCD?

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 26 of 30

**Document Number:** APP-GW-GLN-116

**Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

**C. EVALUATION OF DEPARTURE FROM TIER 2 INFORMATION** (Check correct response and provide justification for that determination under each response)

10 CFR Part 52, Appendix D, Section VIII. B.5.a. provides that an applicant for a combined licensee who references the AP1000 design certification may depart from Tier 2 information, without prior NRC approval, if it does not require a license amendment under paragraph B.5.b. The questions below address the criteria of B.5.b.

1. Does the proposed departure result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific DCD? ☐ YES ☒ NO
  
2. Does the proposed departure result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific DCD? ☐ YES ☒ NO
  
3. Does the proposed departure Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific DCD? ☐ YES ☒ NO
  
4. Does the proposed departure result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific DCD? ☐ YES ☒ NO
  
5. Does the proposed departure create a possibility for an accident of a different type than any evaluated previously in the plant-specific DCD? ☐ YES ☒ NO
  
6. Does the proposed departure create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific DCD? ☐ YES ☒ NO
  
7. Does the proposed departure result in a design basis limit for a fission product barrier as described in the plant-specific DCD being exceeded or altered? ☐ YES ☒ NO
  
8. Does the proposed departure result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses? ☐ YES ☒ NO

**WESTINGHOUSE ELECTRIC COMPANY**  
**AP1000 Licensing Design Change Document**

Page 27 of 30

**Document Number:** APP-GW-GLN-116 **Revision Number:** 0

**Title:** Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

- ☒ The answers to the evaluation questions above are "NO" and the proposed departure from Tier 2 does not require prior NRC review to be included in plant specific FSARs as provided in 10 CFR Part 52, Appendix D, Section VIII. B.5.b
- ☐ One or more of the the answers to the evaluation questions above are "YES" and the proposed change requires NRC review.

**D. IMPACT ON RESOLUTION OF A SEVERE ACCIDENT ISSUE**

10 CFR Part 52, Appendix D, Section VIII. B.5.a. provides that an applicant for a combined licensee who references the AP1000 design certification may depart from Tier 2 information, without prior NRC approval, if it does not require a license amendment under paragraph B.5.c. The questions below address the criteria of B.5.c.

1. Does the proposed activity result in an impact to features that mitigate severe accidents. If ☐ YES ☒ NO the answer is Yes answer Questions 2 and 3 below.
2. Is there is a substantial increase in the probability of a severe accident such that a particular severe accident previously reviewed and determined to be not credible could become credible? ☐ YES ☒ NO ☐ N/A
3. Is there is a substantial increase in the consequences to the public of a particular severe accident previously reviewed? ☐ YES ☒ NO ☐ N/A

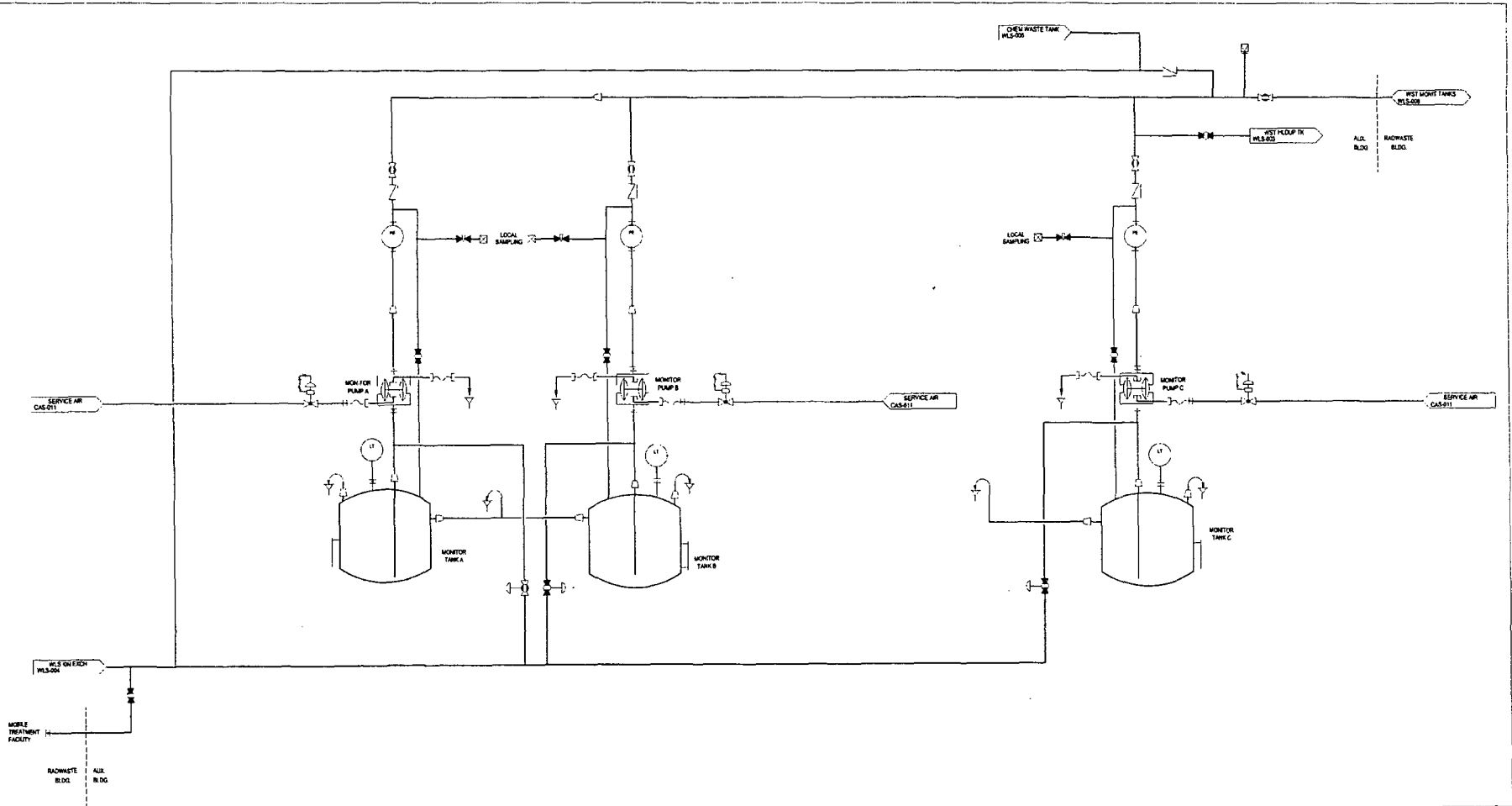
- ☒ The answers to the evaluation questions above are "NO" or are not applicable and the proposed departure from Tier 2 does not require prior NRC review to be included in plant specific FSARs as provided in 10 CFR Part 52, Appendix D, Section VIII. B.5.c
- ☐ One or more of the he answers to the evaluation questions above are "YES" and the proposed change requires NRC review.

**E. SECURITY ASSESSMENT**

1. Does the proposed change have an adverse impact on the security assessment of the AP1000. ☐ YES ☒ NO

Document Number: APP-GW-GLN-116 Revision Number: 0

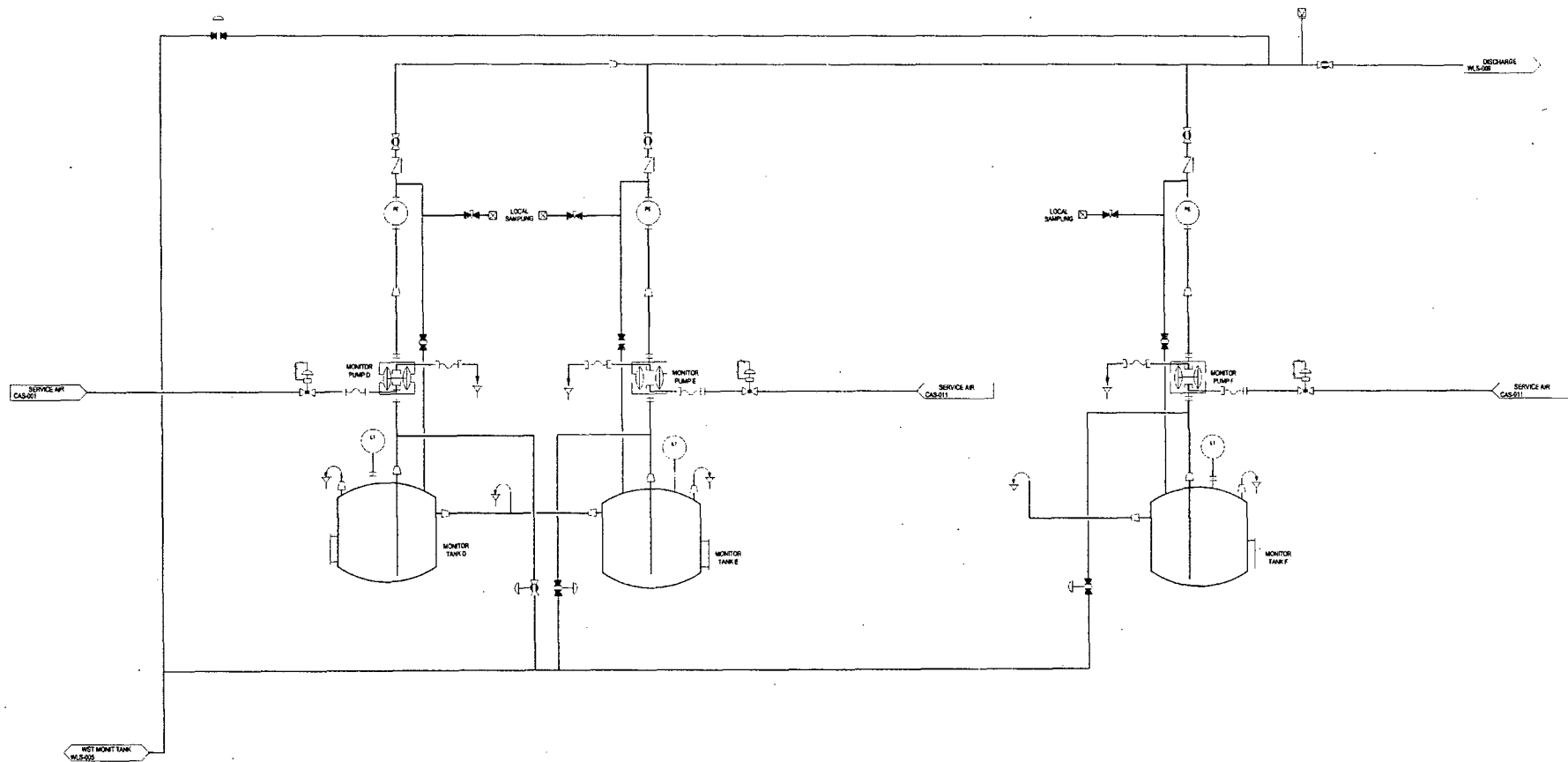
Title: Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension



Inside Auxiliary Building (Boundaries as shown)  
Figure 11.2-2 (Sheet 5 of 8)

Document Number: APP-GW-GLN-116 Revision Number: 0

Title: Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension

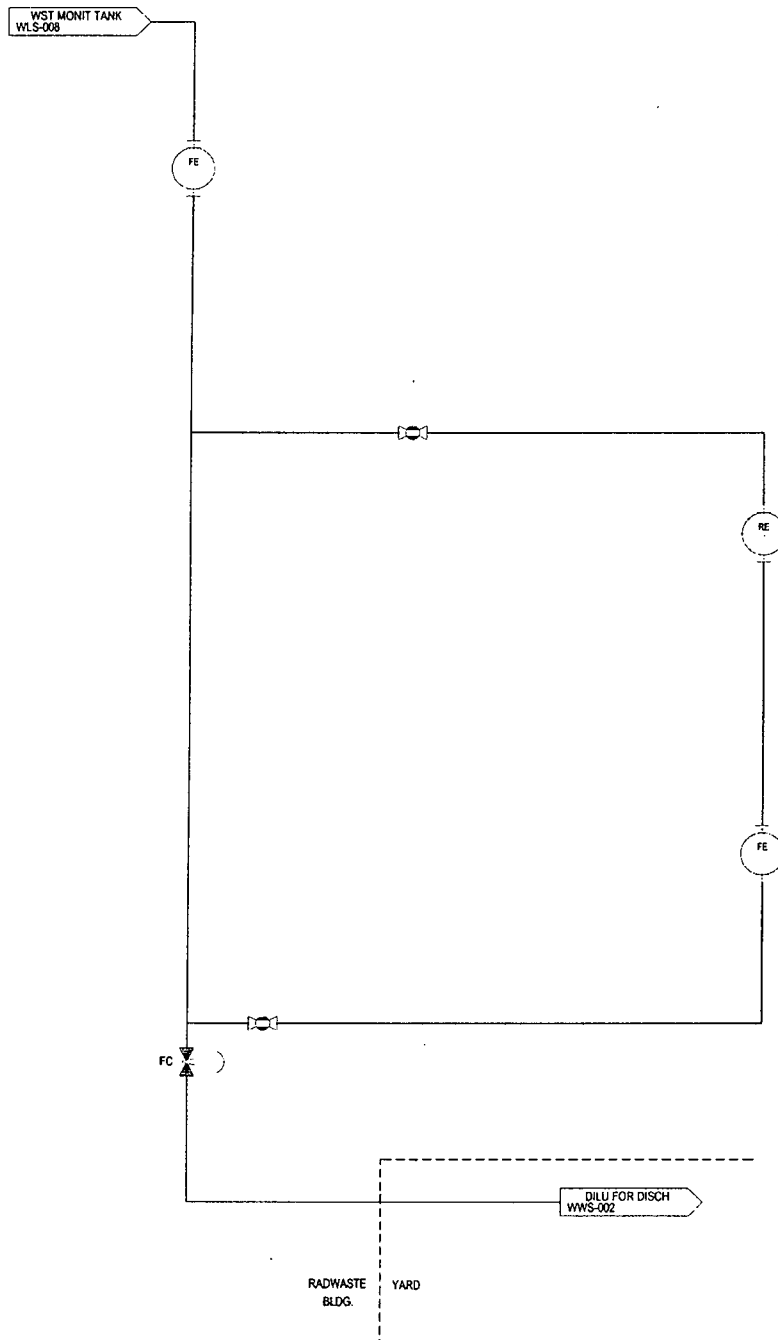


Inside Radwaste Building  
Figure 11.2-2 (Sheet 7 of 8) (New Sheet Added)

Document Number: APP-GW-GLN-116

Revision Number: 0

Title: Additional Liquid Radwaste Monitor Tanks and Radwaste Building Extension



Inside Radwaste Building (Boundaries as shown)  
Figure 11.2-2 (Sheet 8 of 8) (New Sheet Added)