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TOKYO, JAPAN

February 22, 2012

Document Control Desk U.S. Nuclear Regulatory Commission Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021 MHI Ref: UAP-HF-12048

Subject: 2nd Amended MHI's Response to US-APWR DCD RAI No.712-5534 Revision 2 (SRP 11.03)

References: 1) "Request for Additional Information No. 712-5534 Revision 2, SRP Section: 11.03 – Gaseous Waste Management System – Design Certification and New License Applicants, Application Section: 11.3" dated March 7, 2011.

- 2) "MHI's Response to US-APWR DCD RAI No. 712-5534 Revision 2" dated May 17, 2011.
- 3) "Amended MHI's Response to US-APWR DCD RAI No. 712-5534 Revision 2" dated November 21, 2011.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "2nd Amended Response to Request for Additional Information No. 712-5534 Revision 2". This amended response is submitted to reflect some additional editorial corrections to the response to Question 11.03-19.

Enclosed is the response to 1 RAI question that is contained within Reference 1. The initial response was provided in Reference 2. MHI replaces the previous letters (References 2 and 3) with this amended response letter.

This response is being submitted in two versions. One version (Enclosure 1) includes certain information, designated pursuant to the Commission guidance as sensitive unclassified non-safeguards information, referred to as security-related information ("SRI"), that is to be withheld from public disclosure under 10 C.F.R. § 2.390. The information that is SRI is identified by brackets. The second version (Enclosure 2) omits the SRI and is suitable for public disclosure. In the public version, the SRI is replaced by the designation "[Security-Related Information - Withheld under 10 CFR 2.390]."

Please contact Mr. Joseph Tapia, General Manager of Licensing Department, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this submittal. His contact information is provided below.

Sincerely,

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Yoshiki Ogata, Director- APWR Promoting Department Mitsubishi Heavy Industries, LTD.

DUU, KIRO

Enclosure:

- 1. 2nd Amended Response to Request for Additional Information No. 712-5534 Revision 2 (SRI included version)
- 2nd Amended Response to Request for Additional Information No. 712-5534 Revision 2 (SRI excluded version)

CC: J. A. Ciocco

J. Tapia

Contact Information

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UAP-HF-12048 Docket Number 52-021

2nd Amended Response to Request for Additional Information No. 712-5534 Revision 2

February 2012

(SRI Excluded Version)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

2/22/2012

US-APWR Design Certification Mitsubishi Heavy Industries Docket No. 52-021

RAI NO.:	NO.712-5534 REVISION 2
SRP SECTION:	11.03 - GASEOUS WASTE MANAGEMENT SYSTEM
APPLICATION SECTION:	DCD Sections 11.3
DATE OF RAI ISSUE:	3/7/2011

QUESTION NO. : 11.03-19

NRC Staff review of DCD Tier 1, Section 2.7.4.2 and Table 2.7.4.2-1; DCD Tier 2, Sections 9.5.1, 11.3.2.1.3, 11.3.2.1.4, and 14.3.7 and Tables 9A-2, 11.3-3, and 14.3-6; and response to RAI 535-4287, Question 11.03-17 determined that information on a charcoal bed fire analysis in completing the series of malfunction events and ITAAC on explosive monitoring instrumentation which are important to safety was needed. Please address the following items and provide a markup on the proposed DCD changes.

1. In the response to RAI 629-4973, Question 11.03-18, the applicant stated that "the charcoal beds are not required to be included as a potential combustible item because the charcoal beds are managed to be protected from fire." Although there are provisions to prevent auto ignition, the charcoal beds may be exposed to direct flame for a postulated fire in the Auxiliary Building. Therefore, its combustible content should be included and addressed in the Fire Hazard Analysis. DCD Tier 2, Table 9A-2 (Sheet 236 of 293) identifies "Filters" as a potential combustible item in the Auxiliary Building which houses the GWMS. Describe what these "Filters" are and whether they include the charcoal beds in the GWMS.

2. Part C.I.11.3.1 to RG 1.206 states the applicant should describe the design features incorporated to prevent, control, and collect the release of radioactive materials in gaseous effluents due to equipment malfunction or operator error. Therefore, the applicant should add, in DCD Tier 2, Table 11.3-3, an entry corresponding to the charcoal bed fire in presenting a complete series of malfunction events.

3. The ability to maintain gaseous effluent concentrations below the dose limits in 10 CFR Part 20 depends upon several the GWMS design features including instrumentation used to monitor and prevent the accumulation of explosive gas mixtures. Without confirming explosive monitoring instrumentation, the GWMS would fail to meet the design criteria in DCD Tier 2, Section 11.3.1.2. As a result, gaseous effluent releases could exceed the ECLs in 10 CFR Part 20, Appendix B; dose limits in 10 CFR Part 20; and dose objectives in 10 CFR Part 50, Appendix I. Additionally, since the GWMS is not designed to withstand the effects of internal detonations, ITAAC should be included to confirm hydrogen and oxygen monitoring instrumentation in the GWMS design for compliance with 10 CFR 52.47(b)(1) and 10 CFR Parts 20 and 50. Please include the relevant Tier 1 information derived from the GWMS design description in DCD Tier 2, Sections 11.3.2.1.3 and 11.3.2.1.4, and Table 11.3-3 (Sheets 1 of 2) presented in response to RAI 535-4287, Question 11.03-17 (ML101130288) to address explosive monitoring instrumentation.

ANSWER:

1. RG 1.189 requires that both in situ and transient combustible materials be included in the Fire Hazard Analysis (FHA). The charcoal contained within the Gaseous Waste Management System (GWMS) charcoal beds will be included in the potential combustible item. The FHA will be revised to add a new fire zone, FA4-101-25, where the charcoal beds are installed. The charcoal beds are included as the only combustible loading in the new fire zone.

The "filters" listed in the "Potential Combustibles" portion of DCD Rev 3 Tier 2 Table 9A-2 (sheet 236 of 292) for fire zone FA4-101-01 were originally included to conservatively address the combustible loading of the detergent drain filters located on the first basement level of Auxiliary Building. This line item does not represent the activated charcoal. This item will be removed from Table 9A-2 (sheet 236 of 292) as a potential combustible in fire zone FA4-101-01 since the detergent drain filters are always wet and a very small contributor to the overall combustible load.

2. Charcoal bed due to exposure to direct fire in the Auxiliary building during postulated fire reduces radioactive noble gas delay function for gases such as Xe, Kr due to increased temperature which would degrade charcoal bed performance.

In this event, it is necessary to verify operability by purging the exposed bed train with nitrogen gas to cool down the charcoal in beds and prevent oxygen accumulation due to inflowing waste gas containing air after fire accident. Unless the noble gas delay function complies with predetermined performance, it is necessary to replace it with fresh charcoal.

3. As described in US-APWR DCD Tier 2 Section 11.3, GWMS provides the ability to effectively manage radioactive gaseous waste generated during normal plant operation and anticipated operational occurrences (AOO) in order to support ALARA objectives and comply with requirements of 10 CFR 50 Appendix I. GWMS oxygen and hydrogen analyzers and oxygen gas analyzer performance has no safety significance, represents a level of detail that is inconsistent with SRP Section 14.3 selection criteria, and is intentionally omitted from Tier 1.

GWMS charcoal bed hydrogen and oxygen concentration is managed and controlled to prevent internal detonation. Functionality of GWMS hydrogen monitoring will be verified prior to initial reactor criticality by the Gaseous Waste Management System Preoperational Test performed in accordance with RG 1.68 Appendix A Section 1.1.(2) as listed in DCD Tier 2 Table 14A-1 and described by DCD Tier 2 Section 14.2.12.1.81.

Impact on DCD

Revise the fire zone FA4-101-25 where the GWMS charcoal beds are installed in the second paragraph of DCD Subsection 9A.3.129.

Add the following in the forth paragraph of "Fire Detection and Suppression Features" DCD Subsection 9A.3.129.

FA4-101-25 is provided with air aspirating, very early warning fire detection system (VESDA® or equivalent) and manual fire alarm pull station as secondary detection. Primary fire suppression is provided from wet pipe sprinkler. Secondary suppression is provided from fire hose station.

Add the following in the second paragraph of "Fire Protection System Integrity" DCD Subsection 9A.3.129.

The air aspirating fire alarm system is designed for industrial environments.

Revise to add the fire zone FA4-101-25 in DCD Table 9A-1. 11.03-2 Revise to add the fire analysis summary sheet for the fire zone FA4-101-25 in DCD Table 9A-2 (Sheet 259 of 293) and to delete "Filter" as the potential combustibles in DCD Table 9A-2 (Sheet 236 of 293).

Revise to incorporate the addition of the fire zone FA4-101-25 in DCD Table 9A-3 (Sheet 26, 27, and 29 of 32).

Revise to add the fire zone FA4-101-25 in DCD Figure 9A-13 and to change the solid line between fire zones "FA4-101-20" and "FA4-101-18" in DCD Figure 9A-16 to a dotted line to correct an editorial error.

Additionally, as described above and shown on the attached mark-up, Table 11.3-3 (page 11.3-23) will be revised to add "Charcoal bed malfunction".

See Attachment 1 mark-up DCD Revision 3 Tier 2, pages 9A-247 through 9A-249, 9A-283, 9A-521, 9A-544, 9A-603 through 9A-604, 9A-606, 9A-624, 9A-627 and Attachment 2 mark-up DCD Revision 3 Tier 2, pages 11.3-22.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

The S-COLA FSAR Figure 9A-13R will be changed to add the fire zone FA4-101-25.

Impact on PRA

There is no impact on the PRA

Impact on Technical / Topical Reports

There is no impact on a Technical / Topical Reports.

FA4-101-08	Non-Class 1E I&C Room (FA4-101-08)	3.5E+04	
FA4-101-09	Radwaste Control Room	8.9E+04	
FA4-101-10	FA4-101-10 Corridor	2.4E+04	
FA4-101-11	Non-Class 1E I&C Room (FA4-101-11)	3.3E+04	
FA4-101-12	Non-Class 1E I&C Room (FA4-101-12)	3.8E+04	
FA4-101-13	Non-Class 1E Electrical Room (FA4-101-13)	2.6E+04	
FA4-101-14	Communication System Equipment Room	9.8E+03	
FA4-101-15	Resin Fill Tank Room	2.9E+04	
FA4-101-16	Non-Class1E Battery Room	9.0E+04	
FA4-101-17	Boric Acid Batching Tank Room	5.8E+02	
FA4-101-18	HVAC Equipment Room (FA4-101-18)	2.9E+04	
FA4-101-19	TSC Emergency Filtration Unit & Fan Room	3.9E+04	
FA4-101-20	HVAC Equipment Room (FA4-101-20)	2.8E+04	
FA4-101-21	C/V Low Volume Purge Exhaust Filtration Unit Room	4.0E+04	
FA4-101-22	Hold Up Tank Room	2.9E+02	
FA4-101-23	Instrument Maintenance Shop (Cold)	5.0E+01	
FA4-101-24	Auxiliary Building EL.76'-5" Floor	2.4E+01	
<u>FA4-101-25</u>	Auxiliary Building Equipment Room	<u>6.5E+05</u>	DCD_11.03- 19

The borders of this fire area are constructed using reinforced concrete and other material which results in fire resistance that provides at least a 3-hour ASTM E-119 fire rating. Openings and penetrations into this fire area are protected with fire protection features provide at least 3-hour fire resistance.

The area is identified as being associated with non-safety train.

Fire Detection and Suppression Features

FA4-101-07, FA4-101-08, FA4-101-11 and FA4-101-12 are provided with automatic smoke detection, and manual fire alarm pull station is installed as secondary detection. Primary fire suppression is provided from wet-pipe automatic sprinkler system. Secondary suppression is provided from manual fire hose station.

FA4-101-19 and FA4-101-21 are provided with automatic smoke/heat detection, and manual fire alarm pull station is installed as secondary detection. Filter Unit has water spray, and primary fire suppression for this zone is provided from manual fire hose stations. Secondary suppression is provided from portable fire extinguishers.

FA4-101-03 and FA4-101-22 are provided with manual fire alarm pull station. Primary fire suppression is provided from manual fire hose stations. Secondary suppression is provided from portable fire extinguishers.

FA4-101-25 is provided with air aspirating, very early warning fire detection system (VESDA® or equivalent) and manual fire alarm pull station as secondary detection. Primary fire suppression is provided from wet pipe sprinkler. Secondary suppression is provided from fire hose station.

DCD_11.03-19

Other fire zones are provided with automatic smoke detection, and manual fire alarm pull station is installed as secondary detection. Primary fire suppression is provided from manual fire hose stations. Secondary suppression is provided from portable fire extinguishers.

Smoke Control Features

Smoke migration between fire zones is mitigated by appropriately sealed penetrations and openings between zones. Smoke removal as required due to fire within the area to support manual fire fighting efforts is normally vented by the A/B ventilation system and released after appropriate filtration to remove radioactive particulates. Smoke removal from individual zones can be assisted by the plant fire brigade utilizing portable fans and flexible ducting.

Fire Protection Adequacy Evaluation

The fire area boundaries are constructed with concrete walls in excess of 8 inches thick and 3-hour rated fire doors and protected penetrations and openings are provided for fire confinement. HVAC ductwork passing into this area is equipped with fire dampers in accordance with the guidance of NFPA 90A.

The combustible loading in this area's individual fire zones varies from negligible to heavy but is not comprised of highly combustible materials and a fire of sufficient size and intensity to compromise the fire barrier boundaries is not deemed credible.

The fire protection system for this room is designed in accordance with NFPA 72 and 14, and is the combination of smoke detectors and manual hose stations. Based on the expected fire hazards within the compartment during normal operation and the maximum expected fire during equipment maintenance, the 3-hour fire rated boundaries of the compartment are more than sufficient to contain any unsuppressed fire that can be expected to occur within the compartment. On this basis, there is adequate fire protection provided for this compartment (fire area).

Fire Protection System Integrity

The fire protection capability for this area is provided from automatic sprinkler systems and manual hose streams applied by the plant fire brigade. The sprinkler system is designed to code (NFPA 13), the standpipe is designed to code (NFPA 14). These systems have high integrity to guard against inadvertent discharge. Should a fire suppression system discharge, no safety-related equipment would be impacted and no radiological release would be incurred. In the event of a fire, electrical cables, equipment, and instruments in the area would be protected from significant water intrusion since they are installed above the floor elevation above expected flooding levels. The air aspirating fire alarm system is designed for industrial environments.

Safe Shutdown Evaluation

A fire in this area has no potential to damage the ability of safe-shutdown function, because they are not installed in this fire area. The fire in this fire area, therefore, will not adversely impact the ability to achieve and maintain safe-shutdown.

Radioactive Release to Environment Evaluation

The A/B is used to process radwaste resulting from plant operation, and from refueling and maintenance outages. As such, a fire within the Radwaste areas has the potential to release radioactive material. Smoke release from a fire within the A/B is via a filtered exhaust path that will remove radiological material prior to release. Any fire suppression system water discharge would be contained within the A/B and could be processed prior to release to the environment. The A/B is a separate fire area with complete 3-hour fire separation from adjacent safety-related areas. The reinforced concrete construction of most Radwaste handling areas, the fire barrier confinement, automatic fire suppression, and filtered exhaust path provide defense-in-depth assurance that a fire within the A/B would not result is adverse radioactive release to the environment.

9A.3.130 FA5-101 Access Control Building

The FA5-101 AC/B is located adjacent to the west side of the A/B. The AC/B is a three story building providing plant support functions such as security access control to the plant, hot and cold locker rooms for plant personnel, health physics office, radio chemistry laboratory, and miscellaneous support activities. The AC/B is classified as one fire area consisting of two fire zones which do not contain any safety train cables, equipment, or functions associated with safe-shutdown. The maximum fire loading in FA5-101-01 is 2.9E+04 Btu/ft² and the maximum fire loading in FA5-101-02 is 2.7E+04 Btu/ft²

The border of this fire area with the adjacent A/B is constructed using reinforced concrete and other material which results in fire resistance that provides at least a 3-hour ASTM E-119 fire rating. Openings and penetrations with this border wall are protected with fire protection features provide at least 3-hour fire resistance. The other walls of the AC/B are not assigned a fire rating.

The area is identified as being associated with non-safety train.

Fire Detection and Suppression Features

FA5-101-01 and FA5-101-02 are provided with automatic smoke detection, and manual fire alarm pull station is installed as secondary detection. Primary fire suppression is provided from wet-pipe automatic sprinkler system. Secondary suppression is provided from manual fire hose station.

DCD_11.03-

9. AUXILIARY SYSTEMS

Building	Train	Fire Area	Fire Area Designation	Fire Zone	Fire Zone Designation
A/B	N	FA4-101		FA4-101-12	Non-Class 1E I&C Room (FA4-101-12)
A/B	N	FA4-101		FA4-101-13	Non-Class 1E Electrical Room (FA4-101-13)
A/B	N	FA4-101		FA4-101-14	Communication System Equipment Room
A/B	N	FA4-101		FA4-101-15	Resin Fill Tank Room
A/B	N	FA4-101		FA4-101-16	Non-Class 1E Battery Room
A/B	N	FA4-101		FA4-101-17	Boric Acid Batching Tank Room
A/B	N	FA4-101		FA4-101-18	HVAC Equipment Room (FA4-101-18)
A/B	N	FA4-101	Auxiliary Building	FA4-101-19	TSC Emergency Filtration Unit & Fan Room
A/B	N	FA4-101		FA4-101-20	HVAC Equipment Room (FA4-101-20)
A/B	N	FA4-101		FA4-101-21	C/V Low Volume Purge Exhaust Filtration Unit Room
A/B	N	FA4-101		FA4-101-22	Hold Up Tank Room
A/B	N	FA4-101		FA4-101-23	Instrument Maintenance Shop (Cold)
A/B	N	FA4-101		FA4-101-24	Auxiliary Building EL.76'-5" Floor
<u>A/B</u>	N	FA4-101		<u>FA4-101-25</u>	Auxiliary Building Equipment Room
AC/B	N	FA5-101	Access Control Building Area	FA5-101-01	Access Control Building
AC/B	N	FA5-101		FA5-101-02	Technical Support Center

 Table 9A-1
 US-APWR Fire Areas and Fire Zones (Sheet 14 of 16)

| DCD_11.03-19





Fire Zone	Interface	Adjacent Fire Zones]
FA3-119-01	Ceiling	FA3-104-03	
	Floor	FA3-104-01	
	Wall	FA3-103-02, FA3-104-02, FA3-105-01, FA3-106-01, FA3-117-01, FA3-118-01	
FA3-120-01	Ceiling	FA3-112-01, FA3-113-02, FA3-126-01	
	Wall	FA3-112-01, FA3-121-01, FA4-101-01, FA4-101-22	
FA3-121-01	Ceiling	FA3-113-01, FA3-113-03, FA3-123-01	
	Wall	FA3-112-01, FA3-120-01	
FA3-122-01	Ceiling	FA3-109-03, FA3-111-03	
	Floor	FA3-109-01	
	Wall	FA3-109-01, FA3-112-01, FA3-123-01, FA3-124-01	
FA3-123-01	Ceiling	FA3-113-02	
	Floor	FA3-112-01, FA3-121-01	
	Wall	FA3-112-01, FA3-113-01, FA3-113-03, FA3-122-01, FA3-124-01, FA3-126-01	
FA3-124-01	Ceiling	FA3-111-03	
	Floor	FA3-111-01	
	Wall	FA3-109-02, FA3-111-02, FA3-112-01, FA3-113-01, FA3-122-01, FA3-123-01	
FA3-125-01	Ceiling	FA3-105-02	
	Floor	FA3-116-01	
	Wall	FA3-105-02, FA3-106-01, FA3-117-01	
FA3-126-01	Ceiling	FA3-113-02	
	Floor	FA3-120-01	
	Wall	FA3-112-01, FA3-113-02, FA3-123-01	
FA4-101-01	Ceiling	FA4-101-04, FA4-101-21	
	Wall	FA2-115-03, FA2-116-03, FA2-124-01, FA2-153-02, FA3-112-01, FA3-120-01, FA4-101-02, FA4-101-03, FA4-101-04, FA4-101-14, FA4-101-16, FA4-101-22, FA5-101-01 <u>, FA4-101-25</u>	DCD_11.03-
FA4-101-02	Ceiling	Roof	
	Wall	FA2-116-03, FA2-127-07, FA2-128-02, FA2-153-02, FA2-209-05, FA2-210-21, FA2-418-01, FA4-101-01, FA4-101-04, FA4-101-13, FA4-101-15, FA4-101-18, FA4-101-20, FA4-101-24	

 Table 9A-3
 Fire Zone/Fire Area Interfaces (Sheet 26 of 32)

Fire Zone	Interface	Adjacent Fire Zones	
FA4-101-03	Ceiling	FA4-101-17	
	Wall	FA2-118-01, FA2-119-01, FA2-128-01, FA2-128-02, FA2-130-01, FA4-101-01, FA4-101-04	
FA4-101-04	Ceiling	FA4-101-06, FA4-101-07, FA4-101-08, FA4-101-10, FA4-101-11, FA4-101-12, FA4-101-13, FA4-101-14, FA4-101-15, FA4-101-16, FA4-101-20	
	Floor	FA4-101-01 <u>, FA4-101-25</u>	DCD_11.03
·	Wall	FA2-127-07, FA2-128-02, FA2-152-03, FA2-152-04, FA3-109-03, FA3-113-02, FA4-101-01, FA4-101-02, FA4-101-03, FA4-101-15, FA4-101-16, FA4-101-17, FA4-101-22, FA5-101-01	
FA4-101-06	Ceiling	FA4-101-18	
	Floor	FA4-101-04	
	Wall	FA4-101-07, FA4-101-08, FA4-101-10, FA4-101-13	
FA4-101-07	Ceiling	FA4-101-18	
	Floor	FA4-101-04]
	Wall	FA4-101-06, FA4-101-08, FA4-101-10	
FA4-101-08	Ceiling	FA4-101-18	
	Floor	FA4-101-04	
	Wall	FA4-101-06, FA4-101-07, FA4-101-10	
FA4-101-09	Ceiling	FA4-101-18, FA4-101-19][
	Floor	FA4-101-22	
	Wall	FA3-113-02, FA4-101-10	
FA4-101-10	Ceiling	FA4-101-18, FA4-101-19, Roof	
	Floor	FA4-101-04, FA4-101-22	
	Wali	FA2-153-05, FA2-209-05, FA2-317-01, FA2-321-01, FA3-109-03, FA3-113-02, FA3-114-01, FA4-101-06, FA4-101-07, FA4-101-08, FA4-101-09, FA4-101-11, FA4-101-12, FA4-101-13, FA4-101-14, FA4-101-16, FA4-101-18, FA4-101-23, FA5-101-01, FA5-101-02	
FA4-101-11	Ceiling	FA4-101-18	
	Floor	FA4-101-04, FA4-101-22	
	Wall	FA4-101-10, FA4-101-12, FA5-101-01, FA5-101-02	
FA4-101-12	Ceiling	FA4-101-18	
	Floor	FA4-101-04, FA4-101-22	
	Wall	FA4-101-10, FA4-101-11, FA4-101-14, FA5-101-01, FA5-101-02	

Table 9A-3	Fire Zone/Fire Area	Interfaces ((Sheet 27 of 32)	
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Fire Zone	Interface	Adjacent Fire Zones	
FA4-101-22	Ceiling	FA4-101-09, FA4-101-10, FA4-101-11, FA4-101-12	
	Wall	FA3-113-02, FA3-120-01, FA4-101-01, FA4-101-04, FA5-101-01	
FA4-101-23	Ceiling	Roof	
	Floor	FA4-101-18	
	Wall	FA2-210-21, FA2-509-01, FA2-510-02, FA4-101-10	
FA4-101-24	Ceiling	Roof	
	Floor	FA4-101-18, FA4-101-20	
	Wall	FA2-118-01, FA2-119-01, FA2-210-21, FA4-101-02	
FA4-101-25	<u>Ceiling</u>	FA4-101-04	DCD_11.03-
	<u>Wall</u>	<u>FA4-101-01</u>	
FA5-101-01	Ceiling	FA5-101-02, Roof	
	Wall	FA4-101-01, FA4-101-04, FA4-101-10, FA4-101-11, FA4-101-12, FA4-101-14, FA4-101-22, FA5-101-02	
FA5-101-02	Ceiling	Roof	
	Floor	FA5-101-01	
	Wall	FA4-101-10, FA4-101-11, FA4-101-12, FA5-101-01	
FA6-101-01	Ceiling	FA6-101-02, FA6-101-07, FA6-101-08, FA6-101-12	
FA6-101-02	Ceiling	FA6-101-13, FA6-101-16	
	Floor	FA6-101-01	
	Wall	FA6-101-03, FA6-101-04, FA6-101-05, FA6-101-06, FA6-101-07, FA6-101-08, FA6-101-11, FA6-101-12, FA6-101-15	
FA6-101-03	Ceiling	FA6-101-14]
	Wall	FA6-101-02, FA6-101-04, FA6-101-09, FA6-101-15	
FA6-101-04	Ceiling	FA6-101-15	1
	Wall	FA2-102-01, FA2-108-01, FA2-201-01, FA2-202-01, FA2-203-01, FA2-204-01, FA2-205-01, FA2-206-01, FA3-104-03, FA3-111-03, FA3-114-01, FA6-101-02, FA6-101-03, FA6-101-07, FA6-101-08	
FA6-101-05	Ceiling	Roof	
	Wall	FA6-101-02, FA6-101-13, FA6-101-17, FA6-101-19, FA6-101-22	1
FA6-101-06	Ceiling	Roof	
	Wall	FA6-101-02, FA6-101-13, FA6-101-17, FA6-101-19, FA6-101-23]

 Table 9A-3
 Fire Zone/Fire Area Interfaces (Sheet 29 of 32)

9. AUXILIARY SYSTEMS



Figure 9A-13 Fire Zones and Fire Areas A/B EL -26'-4" (B1F)

9. AUXILIARY SYSTEMS



Figure 9A-16 Fire Zones and Fire Areas A/B EL 50'-2" (3F)

Equipment Item	Malfunction	Result(s)	Alternate Action	
Radiation monitor	Fails to indicate.	Radiation monitor indication will be lost. The discharge valve will close and the system automatically switches to the compressor suction and routes the gas to the gas surge tank.	Manual samples can be taken downstream of the gas surge tank by the oxygen and hydrogen analyzer skids to support automatic function. Gas can be released based on the sample results.	
Moisture separator level indication on gas dryer skid	High-level failure causing water level to increase.	The gas dryer will not be able to perform its function and maintain the level/gas flow. The high and low level indication will be lost. The dew point indication downstream of the dryer skid will show excessive moisture.	Operator can manually control the moisture separator level when system is in service.	
Moisture separator level indication for the compressor skid	High or low level failure.	Level indication failure will cause compressor to fail. Compressor will lost its sealing capability and will not be able to maintain the pressure.	Operator can manually control the moisture separator level when the system is in service or switch to backup compressor.	
Oxygen Analyzer with dual independent channels measuring oxygen concentrations	One channel failure	Operation may continue as the other channel can determine oxygen concentration to support continuous operation. MCR operator is notified for channel failure.	Waste gas analyzers data can be used.	
Two separate waste gas analyzers analyzing hydrogen and oxygen concentrations	One waste gas analyzer failure.	Operation may continue as the other waste gas analyzer can determine oxygen and hydrogen concentrations to support continual operation. MCR operator is notified for one analyzer failure; standby analyzer automatically kicks in for analysis.	Oxygen analyzer data can be used.	
Charcoal bed	Charcoal bed is exposed to moisture and the dew point indicates high moisture content	The charcoal bed cannot provide the delay function for the Xe, Kr, or other radionuclide.	Bypass the first train of the carbon beds, purge the tanks with N_2 gas to remove moisture, or replace the bed with a fresh charcoal bed if purging does not work.	
<u>Charcoal bed</u>	Charcoal beds are exposed to direct fire in the Auxiliary Building.	The delay function for radio noble gas such as Xe. Kr and other radionuclide gas will decline due to degradation of exposed charcoal beds.	After extinguishing a fire outside charcoal beds, purge the beds with nitrogen gas to maintain nitrogen rich atmosphere in beds and cool down charcoal temperature. Verify the delay function meets specified requirements and replace the charcoal if necessary.	DCD_11.03 19

Table 11.3-3 Equipment Malfunction Analysis (Sh	heet 1 of 2)
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