

MFFFNPEm Resource

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Sent: Thursday, February 05, 2009 10:30 AM
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Subject: Draft RAIs on Fluid and Mechanical systems
Attachments: RAI Mechanical and fluid mox.doc

Background for our meeting on 2/18

Hearing Identifier: MixedOxideFuelFabricationFacility_NonPublic
Email Number: 1236

Mail Envelope Properties (C56E360E9D804F4B95BC673F886381E71D5E5B4684)

Subject: Draft RAIs on Fluid and Mechanical systems
Sent Date: 2/5/2009 10:29:45 AM
Received Date: 2/5/2009 10:29:47 AM
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Post Office: HQCLSTR02.nrc.gov

Files	Size	Date & Time
MESSAGE	36	2/5/2009 10:29:47 AM
RAI Mechanical and fluid mox.doc		75258

Options

Priority: Standard

Return Notification: No

Reply Requested: No

Sensitivity: Normal

Expiration Date:

Recipients Received:

Requests for Additional Information related to the Mechanical Handling and Fluid Systems for the Mixed Oxide Fuel Fabrication Facility (MFFF)

MH-1 Section 5.3.5.3.1, pp. 5.3.5-56 of the ISA Summary

The double door docking system (DDDS) container is listed as an engineered IROFS. Reference to this container is also made on pp. 5.3.5-58 under the administrative IROFS section. Could the container inadvertently be removed while the double doors are open, or is there a mechanical stop to prevent this? Also, the discussion on this container relating to administrative IROFS mentions "...items removed from the glovebox are properly bagged," which is confusing, since presumably the DDDS container is used in lieu of the bag in/bag out process. Or is the DDDS put into a bag as a defense-in-depth measure?

MH-2

RAIs from the ISA Summary, Section 5.3.5 Load Handling Events

Comments on missing information:

A. The following engineered IROFS were identified in the ISA Summary as necessary for the protection of facility workers, site workers, IOC or the environment, but were not listed in Table 5.3.5-2 as Engineered IROFS. They should be added to Table 5.3.5-2. Items with a ? indicate possible IROFS that are listed, but use inconsistent terminology. Events with a ? indicate IROFS described in Section 5.3.5.3.1, but not listed in the individual event evaluations.

Controls	Events
Jar Tilter in Lift Position (?)	LH-03b2
Jar Lift Out of collision path position sensor (?)	LH-03d1
Ball mill tilter variable frequency drive	LH-03h3
Conveyance cart	LH-10c
Helium chamber door sensors	LH-16a
Mock-up present sensor	LH-16b
Upending fixture movement controls	LH-16e
Light Curtain	LH-16f
Anti-reversing device	LH-16g
Medium Depressurization Exhaust System	?

B. The following administrative IROFS were identified in the ISA Summary as necessary for the protection of facility workers, site workers, IOC or the environment, but were not listed in Table 5.3.5-3 as Administrative IROFS. They should be added to Table 5.3.5-3.

Controls	Events
Restriction on Use of Polyethylene DDDS Bin	LH-10c
Material Handling Controls – Transfer Container	?
Respirator use during contaminated material handling	?

MH-3. In the ISA Summary, sections 5.3.5.2.1 through 5.3.5.2.16, there are several places where the event descriptions are incomplete and the risk discussions are not consistent with the IROFS listed for the event.

- a. For events LH-1, LH-10b, and LH-16a-g (except 16b), the event description does not include the causes identified for this type of event. Is it control system errors, mechanical failure, human error, etc.?
- b. For events LH-03b1 through 03b4; LH-03c1 and 03c2; LH03d1 and 03d2; LH03e1 and 03e2; LH-03f1 and LH-03f2; LH-03h1, 03h2 and 03h3; and LH-04b-d, the event descriptions do not provide sufficient detail to distinguish what specifically occurred for each sub-event, or why these events are addressed separately. Please refer to event LH-14, where the statement "The scenarios of concern are ..." provides an example of a sufficient explanation of the different sub-events.
- c. For event LH-03i, the description states that two jar tilters collide, but does not indicate what dropped or impacted the glovebox. Is it one jar, both jars, or an entire tilter assembly?
- d. Similarly, for LH-04a-d, it is not clear what dropped or impacted the glovebox during maintenance.
- e. For events LH-10a through 10c, the event description does not adequately address the safety strategy for protection of all potentially affected receptors.
- f. For events LH-03b2, the risk discussion does not match the list of IROFS for the event.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described

MH-4. In the ISA Summary, in sections 5.3.5.2.10.1, -2 and -3, the event descriptions for events LH-10a, 10b, and 10c indicate that there could be consequences to the facility worker, site worker, IOC and environment that potentially exceed the regulations. The event description identifies a strategy for the protection of the facility worker, but the safety strategy used for the protection of the site worker, IOC, or environment is not identified.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described

MH-5. In the ISA Summary, in section 5.3.5.2.10.2, the list of IROFS in event LH-10b does not include the use of a respirator while transferring or handling contaminated materials out of the glovebox, although this is described as a protective measure under the risk discussion. Include this protective measures on the list of IROFS for this event or justify why the event is highly unlikely without the use of the respirators. This comment also applies to event LH-10a.

It was also noted that the risk discussions for events LH-10a and b mention the conveyance cart. It is unclear if the conveyance cart is part of these two postulated events. If it is, the event

descriptions should be expanded to include it. Also, if this is the case, add these events to the new IROFS “conveyance cart” in Table 5.3.5-2 (see above comment where this IROFS was added to the table). Also, in Table 5.3.5-2, the entry for the administrative IROFS “respirator use during bag in/bag out” should be revised to add LH-10a and b. At what point during the transfer of a SS DDDS bin on a conveyance cart (LH-10c) would the operator be able to remove his respirator? This should be clarified somewhere.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described

MH-06 In section 5.3.5.2.16.1, the event description for events LH-16a through 16f state that “two different safety approaches are being implemented to counter the potential effects of rod handling events.” The description further lists mitigation and prevention strategies based on the cause of the event. Revise the ISAS to The safety strategy should not be linked to the cause of the event. Also, is the assumption made that the pellets are crushed, and release a puff of radioactive material? If so, then state this in the event description. Also see previous comment regarding the missing causes for many of these sub-events. These event descriptions should be clarified and corrected. The risk discussions of events LH-16a, 16b, and 16g do not address, or insufficiently address the facility worker evacuation. Add words similar to the paragraph in the risk discussion on event LH-16c. Event LH-16g is also missing a discussion on who or what the radiological impacts are, and how they are prevented or mitigated.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described

Comments on the Tables

MH-7 Comments on Table 5.3.5-2

a) In the ISA Summary, in Table 5.3.5-2, the control called “Intermediate/Out of Collision jar lift position sensor” is possibly referred to as the “Jar Lift Out of Collision Path Position Sensor” in the IROFS list for event LH-03d1 in section 5.3.5.2.3.4. This same IROFS is called “Intermediate/Out of Collision jar lift position sensor” when it is described in Section 5.3.5.3.1. Are these two different sensors, or the same one with different names? If the same, then the safety evaluation discussions, IROFS description or Table of IROFS should be revised to provide consistent terminology. Also see previous comment above on inconsistent terminology.

b) In the ISA Summary, in Table 5.3.5-2, the entry for the IROFS “ball mill clamping bell locked and jar clamped sensor” is referred to as “clamping bell locked and jar clamped sensor” in the IROFS listed for event LH-03c1 and when it is described in Section 5.3.5.3.1. This is also true for the “... jar unclamped sensor.” Terminology should be revised as needed to be consistent.

c) In the ISA Summary, in Table 5.3.5-2, the entry for the IROFS “cask on lift position sensors” should refer to event LH-03b4, not LH-03b2. The entry for the IROFS “Lift in low position sensors” should also refer to event LH-03b4. In addition, the entry for the IROFS control “tilter in lift position” should also refer to LH-03b2, and should include the process units NCR and NDS.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described.

License Application Section 11.8 Fluid Systems and ISA Summary Section 4.8 Fluid Systems

FS-1 Section 11.8, pp. 11.8-1 and pp. 11.8-61 of the License Application

Page 11.8-1 states that the fluid reagent system does not contain radioactive material, but page 11.8-61 states that there is a uranyl nitrate reagent system, which contains uranium. Explain this discrepancy or confirm that part of the fluid system contains radioactive material.

FS-2 Section 11.8.1.10.2, pp. 11.8-20 of the License Application

Explain how the Emergency Scavenge Air System is an independent IROFS subsystem of the Instrument Air System? Explain how these systems do not rely on shared components such as piping, compressors, dryers, wiring, and instrumentation and controls.

10 CFR 70.22 requires the applicant to provide a description of the equipment and facilities and proposed procedures to protect health and minimize danger to life and property. The acceptance criteria in Standard Review Plan section 11.3.B.i, System Design, states that a system design, including performance features are described.

FS-3 Section 11.8.2.4.2 pp. 11.8-32 of the License Application

Provide experimental and technical information to justify that the copper pipe for the oxygen system will contort closed in a fire or justify why this assumption is not needed. In the justification provide:

1. Experimental data for situations where the system will perform as required;
2. Reliability data on this system; and
3. The effect of the emergency cooling suppression system on this system.

10 CFR 70.22 requires the applicant to provide a description of the equipment and facilities and proposed procedures to protect health and minimize danger to life and property. The acceptance criteria in Standard Review Plan section 11.3.B.i, System Design, states that a system design, including performance features are described.

FS-4 Section 4.8 pp. 4.8-1 of the ISA Summary

Justify whether the redundant seismic isolation valves independent of each other? Describe their independence or dependence and how this is accounted for in the quantitative probability analysis.

10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan section 3.4.3.2(3), Processes, states that a description at a systems level is acceptable, provided that it permits the NRC reviewer to adequately evaluate: (1) the completeness of the hazard and accident identification tasks; and (2) the likelihood and consequences of the accidents identified.

FS-5 Section 4.8.1.3.2 pp. 4.8-6 of the ISA Summary

Clarify if the term “backup use” is synonymous with defense-in-depth when the term is not describing an IROFS. For example, the demineralized water supply is used as a backup for cooling for the sintering furnace. The demineralized water system is not stated to be an IROFS. The term “backup” also appears in Section 4.8.2.1.1 pp. 4.8-27 of the ISA Summary when describing the nitrogen system as a backup supply for instrument air ventilation, and in Section 4.8.2.1.4 pp. 4.8-29 which states that the nitrogen system is a tertiary backup for the sintering furnace atmospheric scavenging. The nitrogen system is not stated to be an IROFS.

10 CFR 70.22 requires the applicant to provide a description of the equipment and facilities and proposed procedures to protect health and minimize danger to life and property. The acceptance criteria in Standard Review Plan section 11.3.B.i, System Design, states that a system design, including performance features are described.

FS-6 Section 4.8.1.3.4 pp. 4.8-7 of the ISA Summary

Clarify if the term “emergency use” is synonymous with defense-in-depth when the term is not describing an IROFS. For example, the demineralized water supply is used as emergency cooling for the sintering furnace. However, the demineralized water supply is not listed as an IROFS. The term “emergency use” appears in Section 4.8.1.12.1 pp. 4.8-24 of the ISA Summary by stating the breathing air system is used for emergency use. The breathing air system is not stated to be an IROFS. The term “emergency use” also appears in Section 4.8.2.1.1 pp. 4.8-27 by stating that for emergency operations, the nitrogen system serves as a backup to dry air for the pelletizing press bellows, and as a backup to argon/hydrogen for the furnace/airlock scavenging for the BMP sintering furnaces. The nitrogen system is not stated to be an IROFS.

10 CFR 70.22 requires the applicant to provide a description of the equipment and facilities and proposed procedures to protect health and minimize danger to life and property. The acceptance criteria in Standard Review Plan section 11.3.B.i, System Design, states that a system design, including performance features are described.

FS-7 Section 4.8.1.5.2 pp. 4.8-10 of the ISA Summary

Provide a diagram showing which isolation valves in the steam supply lines to steam jets in the AP process units are IROFS. Also, describe how these valves are operated (remotely, manually), what type of valves these are (air operated, electrical) and what components are within the valve IROFS boundary.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described.

FS-8 Section 4.8.1.7 pp.4.8-13 of the ISA Summary

Describe the human actions that are required to be performed inside the emergency diesel generator building while the emergency diesel generators are in operation. Describe any measure taken to ensure that the person will be able to perform those required functions with minimal distress from noise or heat generated from the operating diesel generators. State if there are any exhaust system silencer/piping used for the emergency diesel generator, and if

this system is an industry "standard design" rated for indoor use. State if this exhaust system would be considered part of the EDGFOS or part of the Emergency AC Power System.

10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." Standard Review Plan 11.4.2.2.C recommends that the independent onsite power sources be designed to have no single failure vulnerability. Excessive noise and heat can be. Extreme noise in the EDG rooms could lead to operator fatigue and become a single failure vulnerability. The criteria and description of the industry standards and ratings for the EDG exhaust systems was not provided.

FS-9 Section 4.8.1.7.2 pp. 4.8-15 of the ISA Summary

State if there are there any credible accident sequences associated with the diesel fuel pump accidentally not turning off. If this accident sequence is not credible, justify the reason. If this accident sequence is credible, state and justify the qualitative consequence level.

10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan section 3.4.3.2(3), Processes, states that a description at a systems level is acceptable, provided that it permits the NRC reviewer to adequately evaluate: (1) the completeness of the hazard and accident identification tasks; and (2) the likelihood and consequences of the accidents identified.

FS-10 Section 4.8.1.8 pp. 4.8-16 of the ISA Summary

Verify that the Standby Diesel Generator Fuel Oil is a system and that the title should contain the word "system". Section 4.8.1.8.1 of the ISA Summary states that it is a system, but Section 4.8.1.8 does not state that it is a system.

FS-11 Section 4.8.1.9.2, pp. 4.8-17 of the ISA Summary

Explain why the service air system is not part of the tank agitation IROFS boundary. Page 4.8-17 of the ISA Summary states that the service air system provides air for tank agitation. The service air system is not an IROFS. On pp. 5.3.7-575, Table 5.3.7-64, Event KPB-02 states that tank agitation is required for Preventive Control 2, which is part of the IROFS.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described.

FS-12 Section 4.8.1.11.3 pp. 4.8-23 of the ISA Summary

Verify that the redundant relays lock outs for the transfer pump are part of the sampling validation IROFS. The redundant relays are stated as IROFS in Section 4.8.1.11.2 of the ISA Summary.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described.

FS-13 Section 4.8.2.2.2 pp. 4.8-30 of the ISA Summary

Explain whether or not the hydrogen detectors are part of the IROFS since they are part of the redundant IROFS isolation valves that isolate gas mixture in the event of a leak. The hydrogen detectors should be part of the IROFS since it supports the safety function of detection high hydrogen content.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described.

FS-14 Section 4.8.2.2.2 pp. 4.8-30 of the ISA Summary

Explain whether or not the isolation valves for the argon/hydrogen system serve an IROFS or defense-in-depth function in preventing downstream sintering furnaces from an over-pressure conditions should the associated upstream pressure control valve malfunction. These valves are not identified as IROFS or as defense-in-depth for the Sintering Furnace Overpressurization, LOC-12c accident sequence in Section 5.3.3.2.12.3 on pp. 5.3.3-62 in the ISA Summary.

10 CFR 70.62(c)(vi) states that each item relied on for safety identified pursuant to 70.61(e), the characteristics of its preventive, mitigative, or the safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 70.61 is described.

PS-15 Section 4.8.3, pp. 4.8-37 of the ISA Summary

Explain the discrepancies between the IROFS sampling procedure for reagents. Throughout Section 4.8.3 of the ISA Summary, there are differences between some sampling procedure. For example:

- a) Some pumps are locked out by IROFS instrumentation during sample validation to prevent transfer of nonconforming solution to downstream users and some are not. Section 4.8.1.11.2 on page 4.8-23 states that the decontamination system pumps are locked out by IROFS instrumentation during sample validation. However, Section 4.8.3.16.2 on page 4.4.8-66 states that the uranyl nitrate distribution tank is sampled as an IROFS, but the transfer pump is not locked out during sample validation.
- b) Some levels in the tanks are monitored as part of the IROFS sampling and some are not. Section 4.8.3.1.2 on page 4.8-39 states that the nitric acid tank is sampled as an IROFS. It also states that the level in the preparation tank is monitored after sampling to ensure that no leakage into or out of the tank has occurred. Section 4.8.3.16.2 on page 4.4.8-66 states that the uranyl nitrate distribution tank is sampled as an IROFS, but the tank level is not monitored.
- c) Confirm that the aluminum nitrate is analyzed in the plant laboratory. Most all of the reagents that have IROFS sampling are analyzed in the plant laboratory to verify the concentration of the solution except on. However, Section 4.8.3.11.2 on page 4.8-58 states that the aluminum nitrate is analyzed, but does not state where it is analyzed.

10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan section 3.4.3.2(3), Processes, states that a description at a systems level is acceptable, provided that it permits the NRC reviewer to adequately evaluate: (1) the completeness of the hazard and accident identification tasks; and (2) the likelihood and consequences of the accidents identified.

FS-16 Section 4.8.3.15.1 pp. 4.8-64 of the ISA Summary

Clarify whether or not the sodium nitrite sampling need to be an IROFS. Similar systems, like the aluminum nitrate system feed into the AP process are IROFS. If the sodium nitrite sampling is not an IROFS, justify why this is acceptable.

10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan section 3.4.3.2(3), Processes, states that a description at a systems level is acceptable, provided that it permits the NRC reviewer to adequately evaluate: (1) the completeness of the hazard and accident identification tasks; and (2) the likelihood and consequences of the accidents identified.

FS-17 Section 4.8.4 pp. 4.8-67 of the ISA Summary

List which Codes and Standards are applicable to each fluid system and include them in the ISA Summary and the License Application.

10 CFR 70.65(b)(3) states that the ISA Summary must contain "a general description of the facility with emphasis on those areas that could affect safety." The acceptance criteria in Standard Review Plan section 3.4.3.2(3), Processes, states that a description at a systems level is acceptable, provided that it permits the NRC reviewer to adequately evaluate: (1) the completeness of the hazard and accident identification tasks; and (2) the likelihood and consequences of the accidents identified.