

**MOX FUEL FABRICATION FACILITY  
PRINCIPAL STRUCTURES, SYSTEMS AND COMPONENTS  
COMPLETION VERIFICATION REPORT**

**PSSC-11**

**ELECTROLYZER STRUCTURE**

**1. CB&I AREVA MOX Services (MOX Services) Completion Letter**

MOX Services submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) on December 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15362A554) which committed to submitting Principal Structure, System and Components (PSSCs) completion letters to the NRC and provide timely notification to support NRC staff findings as required in Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 70.23(a)(8). The PSSC completion letters were to be based on their internally prepared PSSC completion packages. This letter also included a crosswalk that correlated the Construction Authorization Request (CAR) PSSCs to the Items Relied on for Safety (IROFS) in the Integrated Safety Analyses Summary (ISAS).

On December 5, 2017, MOX Services submitted a letter notifying the NRC that they believe that the PSSC-11 (Electrolyzer Structure) is complete in accordance with the application in support of the regulatory requirements in 10 CFR 70.23(a)(8) subject to verification by the NRC.

MOX Services basis for completion of PSSC-011 is that the safety functions for this PSSC that were derived from the CAR have been consolidated, in accordance with Table 17-1 of the License Application (LA), into one ISAS Control Group (Electrolyzer Insulators and Isolators). The electrolyzer IROFS components associated with PSSC-011 are identical to the IROFS components associated with PSSC-026 (Guide Sleeves). Since the IROFS components associated with PSSC-011 are repeated in PSSC-026, PSSC-011 can be administratively closed.

**2. Description of PSSC(s)**

PSSC-011, Electrolyzer Structure, is associated with the CAR Event Group "AP Electrolyzer". This CAR event is mapped to ISAS Events F-05a and F-05b. ISAS Event F-05a pertains to fires involving the titanium electrolyzer during operation and is the subject of this completion letter. ISAS Event F-05b pertains to fires involving the titanium electrolyzer during maintenance. Event F-05b is mapped to PSSC-030, "Maintenance Activity Controls" and is outside the scope of this completion letter.

The ISAS Control Group mapped to PSSC-011, "Electrolyzer Structure", is "Electrolyzer Insulators and Isolators". This is the only Control Group associated with PSSC-011 and was designated as PSSC-011-001. There are three electrolyzers included in the Mixed Oxide Fuel Fabrication Facility. One electrolyzer (KDB\*EZR1000) is associated with the Dissolution (KDB) unit and is contained within glovebox KDB\*GB1000. Two electrolyzers (KDD\*EZR1000 and KDD\*EZR2000) are associated with the Dissolution of Chlorinated Feed (KDD) unit and are contained with gloveboxes KDD\*GB1000 and KDD\*GB2000, respectively.

PSSC-011-001 is mapped to ISAS Control Group “Electrolyzer Insulators and Isolators”. The IROFS components associated with PSSC-011-001 are the same as the IROFS components associated with PSSC-026-001. Therefore, PSSC-011-001 is considered a duplicate of PSSC-026-001 and is administratively closed. Closing PSSC-011-001 to PSSC-026-001 is consistent with the information presented in LA Table 17-1, *PSSC Completion (not including criticality IROFS)*.

### **3. NRC Independent Verification Plan (IVP) Discussion**

Independent Verification Plan (IVP) - 6, entitled “Electrolyser Components” was prepared to guide the NRC staff’s completion of the PSSC. The original draft MOX Services scoping document for PSSC-11, which was the basis for the IVP, noted that all IROFS components were associated with the “Electrolyser Insulators and Isolators” ISA control group. The consolidation of PSSC-11 into PSSC-26, does not impact the scope of or verification activities to be performed by the staff since the IROFS component identification has not changed. The IROFS for the Electrolyzer structure will be verified as part of the review of PSSC-26, “Guide Sleeves”

### **4. IROFS Evaluated from IVP**

The IROFS control group “Electrolyzer Components” will be evaluated under PSSC-026, “Guide Sleeves”. The verification of the completion of these IROFS will be evaluated by the staff as part of the review of the completion of PSSC-026.

### **5. Review of Vendor activity(s)**

N/A

### **6. Level of Inspection Effort**

N/A

### **7. Inspection Activities**

The following inspection activities were performed:

#### **7.1. Regional Inspections**

No Regional Inspection activities were needed to verify this PSSC.

#### **7.2. Resident Inspector Activities**

No Resident Inspection activities were needed to verify this PSSC.

#### **7.3. Headquarters Verification Activities**

No headquarters reviews of procedures were needed to verify this PSSC.

### **Other Supporting activities**

No other supporting activities were needed to verify completion of this PSSC.

## **8. Summary of Verification Activities**

MOX Services basis for completion of PSSC-011 is that the safety functions derived from the CAR have been consolidated, in accordance with Table 17-1 of the LA, into one ISAS Control Group (Electrolyzer Insulators and Isolators). The electrolyzer IROFS components associated with PSSC-011 are identical to the IROFS components associated with PSSC-026 (Guide Sleeves). Since the IROFS components associated with PSSC-011 are repeated in PSSC-026, PSSC-011 can be administratively closed.

Since the PSSC safety functions associated with the Electrolyzer Structure have been consolidated into PSSC-26, "Guide Sleeve", there are no IROFS components or administrative controls associated with PSSC-11. The IROFS control group (Electrolyzer Insulators and Isolators) will also be evaluated as part of the verification of PSSC-026.

Therefore the staff has completed its verification of PSSC-11 and has concluded that, as per 10 CFR 70.23(a)(8), that it is completed in accordance with the application.

## **9. References**

- 10.1 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility Integrated Safety Analysis Summary," January 2018.
- 10.2 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility License Application," January 2018.
- 10.3 NRC Independent Verification Plan 006. "Electrolyzer Structure" (Revision 0)," September 23, 2011.
- 10.4 CB&I AREVA MOX Services letter entitled "10 CFR 70.23 (a)(8) Completion Process," dated December 21, 2015.
- 10.5 CB&I AREVA MOX Services. "PSSC-11 Completion Letter," dated December 5, 2017.
- 10.6 Construction Authorization Request, February 2005.

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**PSSC-15**

**EMERGENCY DC POWER SYSTEM**

**1. CB&I AREVA MOX Services (MOX Services) Completion Letter**

MOX Services submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) on December 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15362A554) which committed to submitting Principal Structure, System and Components (PSSCs) completion letters to the NRC to provide timely notification to support the staff's finding as required in Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 70.23(a)(8). The PSSC completion letters were to be based on their internally prepared PSSC completion packages. This letter also included a crosswalk that correlated the Construction Authorization Request (CAR) PSSCs to the Items Relied on for Safety (IROFS) in the Integrated Safety Analyses Summary (ISAS).

On December 5, 2017, MOX Services submitted a letter notifying the NRC that they believe that the PSSC-15 (Emergency DC Power System) is complete in accordance with the application in support of the regulatory requirements in 10 CFR 70.23(a)(8) subject to verification by the NRC.

MOX Services basis for completion of PSSC-015 is that the safety functions derived from the CAR have been consolidated, in accordance with Table 17-1 of the License Application (LA), into the scope of PSSC-012 Emergency AC Power Systems. Since the IROFS components associated with PSSC-015 are repeated in PSSC-012, PSSC-015 can be administratively closed.

**2. Description of PSSC(s)**

PSSC-015, Emergency DC Power System, is associated with the (CAR Event Group "Loss of Offsite Power". This CAR event is mapped to ISAS Event EMMH-03. The emergency power system is comprised of emergency AC and emergency DC power systems. The Emergency AC Power System is addressed in PSSC-012.

The Emergency DC Power System consists of two 100 percent redundant and independent trains that provide 125 VDC power to IROFS loads. Each train consists of a 125 VDC battery, battery charger, power disconnect switch, power distribution panel, circuit breaker panelboards, and power cables that provide, distribute, and control 125 VDC power. As indicated above, the Emergency DC Power System, along with the Emergency AC Power System, are considered together as the Emergency Power System. As described in LA Table 17-1, *PSSC Completion (not including criticality IROFS)*, the scope of PSSC-015-001 is included in the scope of PSSC-012.

### **3. NRC Independent Verification Plan (IVP) Discussion**

Independent Verification Plan (IVP) - 7, entitled "Emergency Systems" was prepared to guide the NRC staff's completion of the PSSC. The original draft MOX Services scoping document for PSSC-12, which was the basis for the IVP, noted all IROFS components related to that PSSC. The consolidation of PSSC-15 into PSSC-12, does not impact the scope of or verification activities to be performed by the staff since the IROFS component identification has not changed. The IROFS for the Emergency DC Power System structure will be verified as part of the review of PSSC-12, "Emergency AC Power Systems".

### **4. IROFS Evaluated from IVP**

The IROFS components will be evaluated under PSSC-12, Emergency AC Power Systems. The verification of the completion of these IROFS will be evaluated by the staff as part of the review of the completion of PSSC-012.

### **5. Review of Vendor activity(s)**

N/A

### **6. Level of Inspection Effort**

N/A

### **7. Inspection Activities**

The following inspection activities were performed:

#### **7.1. Regional Inspections**

No Regional Inspection activities were needed to verify this PSSC.

#### **7.2. Resident Inspector Activities**

No Resident Inspection activities were needed to verify this PSSC.

#### **7.3. Headquarters Verification Activities**

No headquarters reviews of procedures were needed to verify this PSSC.

## **8. Other Supporting activities**

No other supporting activities were needed to verify completion of this PSSC.

## **9. Summary of Verification Activities**

MOX Services basis for completion of PSSC-015 is that the safety functions derived from the CAR have been consolidated, in accordance with Table 17-1 of the LA, into PSSC-012. Since the IROFS components associated with PSSC-015 have been consolidated into PSSC-012, PSSC-015 can be administratively closed.

Since the PSSC safety functions associated with the Emergency DC Power Systems have been consolidated into PSSC-12, "Emergency AC Power Systems", there are no IROFS components or administrative controls associated with PSSC-15. The IROFS related to the Emergency power systems will also be evaluated as part of the verification of PSSC-012.

Therefore the staff has completed its verification of PSSC-15 and has concluded that, as per 10 CFR 70.23(a)(8), that it is completed in accordance with the application.

## **10. References**

- 10.1 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility Integrated Safety Analysis Summary," January 2018.
- 10.2 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility License Application," January 2018.
- 10.3 NRC Independent Verification Plan 007. "Emergency Systems" (Revision 0)," September 23, 2011.
- 10.4 CB&I AREVA MOX Services letter entitled "10 CFR 70.23 (a)(8) Completion Process," dated December 21, 2015.
- 10.5 CB&I AREVA MOX Services. "PSSC-15 Completion Letter," dated December 5, 2017.
- 10.6 Construction Authorization Request, February 2005.

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**PSSC-39**

**PTFE Insulator**

**1. CB&I AREVA MOX Services (MOX Services) Completion Letter**

MOX Services submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) on December 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15362A554) which committed to submitting Principal Structure, System and Components (PSSCs) completion letters to the NRC to provide timely notification to support the staffs finding as required in Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 70.23(a)(8). The PSSC completion letters were to be based on their internally prepared PSSC completion packages. This letter also included a crosswalk that correlated the Construction Authorization Request (CAR) PSSCs to the Items Relied on for Safety (IROFS) in the Integrated Safety Analyses Summary (ISAS).

On December 5, 2017, MOX Services submitted a letter notifying the NRC that they believe that the PSSC-39 (PTFE Insulator) is complete in accordance with the application in support of the regulatory requirements in 10 CFR 70.23(a)(8) subject to verification by the NRC.

MOX Services basis for completion of PSSC-039 is that the safety functions derived from the CAR have been consolidated, in accordance with Table 17-1 of the License Application (LA), into one ISAS Control Group (Electrolyser Insulators and Isolators). The electrolyser IROFS components associated with PSSC-039 are identical to the IROFS components associated with PSSC-026 (Guide Sleeves). Since the IROFS components associated with PSSC-039 are repeated in PSSC-026, PSSC-039 can be administratively closed.

**2. Description of PSSC(s)**

PSSC-039, PTFE Insulator Structure, is associated with the CAR Event Group "AP Electrolyzer". This CAR event is mapped to ISAS Events F-05a and F-05b. ISAS Event F-05a pertains to fires involving the titanium electrolyzer during operation and is the subject of this completion letter. ISAS Event F-05b pertains to fires involving the titanium electrolyzer during maintenance. Event F-05b is mapped to PSSC-030, "Maintenance Activity Controls" and is outside the scope of the completion letter.

The ISAS Control Group mapped to PSSC-039, "PTFE Insulator", is "Electrolyzer Insulators and Isolators". This is the only Control Group associated with PSSC-039 and was designated as PSSC-039-001. There are three electrolyzers included in the Mixed Oxide Fuel Fabrication Facility (MFFF). One electrolyzer (KDB\*EZR1000) is associated with the Dissolution (KDB) unit and is contained within glovebox KDB\*GB1000. Two electrolyzers (KDD\*EZR1000 and KDD\*EZR2000) are associated with the Dissolution of Chlorinated Feed (KDD) unit and are contained with gloveboxes KDD\*GB1000 and KDD\*GB2000, respectively.

PSSC-039-001 is mapped to ISAS Control Group "Electrolyzer Insulators and Isolators". The IROFS components associated with PSSC-039-001 are the same as the IROFS components

associated with PSSC-026-001. Therefore, PSSC-039-001 is considered a duplicate of PSSC-026-001 and is administratively closed. Closing PSSC-039-001 to PSSC-026-001 is consistent with the information presented in LA Table 17-1, *PSSC Completion (not including criticality IROFS)*.

### **3. NRC Independent Verification Plan (IVP) Discussion**

Independent Verification Plan (IVP) -6, entitled “Electrolyser Components” was prepared to guide the NRC staff’s completion of the PSSC. The original draft MOX Services scoping document for PSSC-039, which was the basis for the IVP, noted that all IROFS components were associated with the “Electrolyser Insulators and Isolators” ISA control group. The consolidation of PSSC-039 into PSSC-026, does not impact the scope of or verification activities to be performed by the staff since the IROFS component identification has not changed. The IROFS for the Electrolyzer structure will be verified as part of the review of PSSC-26, “Guide Sleeves”

### **4. IROFS Evaluated from IVP**

The IROFS control group “Electrolyzer Components” will be evaluated under PSSC-026, “Guide Sleeves”. The verification of the completion of these IROFS will be evaluated by the staff as part of the review of the completion of PSSC-026.

### **5. Review of Vendor activity(s)**

N/A

### **6. Level of Inspection Effort**

N/A

### **7. Inspection Activities**

The following inspection activities were performed:

#### **7.1. Regional Inspections**

No Regional Inspection activities were needed to verify this PSSC.

#### **7.2. Resident Inspector Activities**

No Resident Inspection activities were needed to verify this PSSC.

#### **7.3. Headquarters Verification Activities**

No headquarters reviews of procedures were needed to verify this PSSC.



## **8. Other Supporting activities**

No other supporting activities were needed to verify completion of this PSSC.

## **9. Summary of Verification Activities**

MOX Services basis for completion of PSSC-039 is that the safety functions derived from the CAR have been consolidated, in accordance with Table 17-1 of the LA, into one ISAS Control Group (Electrolyser Insulators and Isolators). The electrolyser IROFS components associated with PSSC-039 are identical to the IROFS components associated with PSSC-026 (Guide Sleeves). Since the IROFS components associated with PSSC-039 are repeated in PSSC-026, PSSC-011 can be administratively closed.

Since the PSSC safety functions associated with the Electrolyzer Structure have been consolidated into PSSC-26, "Guide Sleeve", there are no IROFS components or administrative controls associated with PSSC-39. The IROFS control group (Electrolyzer Insulators and Isolators) will also be evaluated as part of the verification of PSSC-026.

Therefore the staff has completed its verification of PSSC-039 and has concluded that, as per 10 CFR 70.23(a)(8), that it is completed in accordance with the application.

## **10. References**

- 10.1 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility Integrated Safety Analysis Summary," January 2018.
- 10.2 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility License Application," January 2018.
- 10.3 NRC Independent Verification Plan 006. "Electrolyzer Structure" (Revision 0)," September 23, 2011.
- 10.4 CB&I AREVA MOX Services letter entitled "10 CFR 70.23 (a)(8) Completion Process," dated December 21, 2015.
- 10.5 CB&I AREVA MOX Services. "PSSC-39 Completion Letter," dated December 5, 2018.
- 10.6 Construction Authorization Request, February 2005.

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**PSSC-14**

**Emergency Control System**

**1. CB&I AREVA MOX Services (MOX Services) Completion Letter**

MOX Services submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) on December 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15362A554) which committed to submitting Principal Structure, System and Components (PSSCs) completion letters to the NRC to provide timely notification to support the staff's finding as required in Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 70.23(a)(8). The PSSC completion letters were to be based on their internally prepared PSSC completion packages. This letter also included a crosswalk that correlated the Construction Authorization Request (CAR) PSSCs to the Items Relied on for Safety (IROFS) in the Integrated Safety Analyses Summary.

On May 17, 2018, MOX Services submitted a letter notifying the NRC that they believe that the PSSC-14 (Emergency Control System) is complete in accordance with the application in support of the regulatory requirements in 10 CFR 70.23(a)(8) subject to verification by the NRC.

MOX Services basis for completion of PSSC-014 is that the safety functions derived from the CAR have been consolidated, in accordance with Table 17-1 of the LA, into other PSSC's. Since the IROFS components associated with PSSC-014 are repeated in other PSSC's, PSSC-014 can be administratively closed.

**2. Description of PSSC(s)**

The CAR lists PSSC-014, Emergency Control System, as a PSSC. However, the CAR does not relate this PSSC to an event. As presented in the CAR, the Emergency Control System is comprised of ten safety functions and provides support for other PSSCs. The safety functions are associated with automatic and manual controls over electrical power distribution and supply systems, ventilation systems, and seismic isolation systems.

The IROFS components associated with PSSC-014, Emergency Control System, are contained in PSSC-005, C3 Confinement System (HDE) (PSSC-005-001); PSSC-006, C4 Confinement System (VHD) (PSSC-006-015); PSSC-012, Emergency AC Power System (PSSC-012-001 through PSSC-012-013); PSSC-013, Emergency Control Room Air-Conditioning System (HVC) (PSSC-013-001); PSSC-015, Emergency DC Power System (PSSC-015-001); PSSC-017, Emergency Generator Ventilation System (HVD) (PSSC-017-001); PSSC-018, Emergency Diesel Generator Fuel Oil System (EGF) (PSSC-018-001), PSSC-044, Process Cell Exhaust System (POE) (PSSC-044-003); and PSSC-046, Seismic Monitoring System & Associated Seismic Isolation Valves (PSSC-046-001). The above information is consistent with the information presented in LA Table 17-1, *PSSC Completion (not including criticality IROFS)*.

### **3. NRC Independent Verification Plan (IVP) Discussion**

Independent Verification Plan (IVP) -007, entitled "Emergency Systems" was prepared to guide the NRC staff's completion of the PSSC. The original draft MOX Services scoping document for PSSC-14, which was the basis for the IVP, noted that all IROFS components related to that PSSC. Since the IROFS from PSSC-014 have been consolidated into the other identified PSSCs, the closure of PSSC-014, does not impact the scope of or verification activities to be performed by the staff since the IROFS component identification has not changed.

### **4. IROFS Evaluated from IVP**

As discussed above, the scope of PSSC-014 is included in the scope of other PSSCs. As such, the IROFS components associated with PSSC-014 will be captured during the completion of other PSSCs. Therefore, as the scope of PSSC-014 is included in other PSSCs, PSSC-014 does not need to be evaluated separately.

### **5. Review of Vendor activity(s)**

N/A

### **6. Level of Inspection Effort**

N/A

### **7. Inspection Activities**

The following inspection activities were performed:

#### **7.1. Regional Inspections**

No Regional Inspection activities were needed to verify this PSSC.

#### **7.2. Resident Inspector Activities**

No Resident Inspection activities were needed to verify this PSSC.

#### **7.3. Headquarters Verification Activities**

No headquarters reviews of procedures were needed to verify this PSSC.

### **8. Other Supporting activities**

No other supporting activities were needed to verify completion of this PSSC.

### **9. Summary of Verification Activities**

MOX Services basis for completion of the scope of PSSC-014 is that IROFS from this PSSC are included in the scope of other PSSCs. As such, the IROFS components associated with PSSC-014 will be captured during the completion of other PSSCs. Therefore, as the scope of PSSC-014 is included in other PSSCs, PSSC-014 is administratively closed.

Since the PSSC safety functions associated with the Emergency Control System have been consolidated into other PSSC's, there are no IROFS components or administrative controls associated with PSSC-14.

Therefore the staff has completed its verification of PSSC-14 and has concluded that, as per 10 CFR 70.23(a)(8), that it is completed in accordance with the application.

## **10. References**

- 10.1 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility Integrated Safety Analysis Summary," January 2018.
- 10.2 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility License Application," January 2018.
- 10.3 NRC Independent Verification Plan 007. "Emergency Systems" (Revision 0)," September 23, 2011.
- 10.4 CB&I AREVA MOX Services letter entitled "10 CFR 70.23 (a)(8) Completion Process," dated December 21, 2015.
- 10.5 CB&I AREVA MOX Services. "PSSC-14 Completion Letter," dated May 17, 2018.
- 10.6 Construction Authorization Request, February 2005.

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**PSSC-33**

**Material Maintenance and Surveillance Programs**

**1. CB&I AREVA MOX Services (MOX Services) Completion Letter**

MOX Services submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) on December 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15362A554) which committed to submitting Principal Structure, System and Components (PSSCs) completion letters to the NRC to provide timely notification to support the staff's finding as required in Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 70.23(a)(8). The PSSC completion letters were to be based on their internally prepared PSSC completion packages. This letter also included a crosswalk that correlated the Construction Authorization Request (CAR) PSSCs to the Items Relied on for Safety (IROFS) in the Integrated Safety Analyses Summary (ISAS).

On May 9, 2018, MOX Services submitted a letter notifying the NRC that they believe that the PSSC-33 (Material Maintenance and Surveillance Programs) is complete in accordance with the application in support of the regulatory requirements in 10 CFR 70.23(a)(8) subject to verification by the NRC.

MOX Services basis for completion of PSSC-033 is that the safety functions derived from the CAR have been consolidated, in accordance with Table 17-1 of the LA, into the scope of PSSC-024 (Glovebox), PSSC-041 (Process Cells) and PSSC-006 (VHD). Since the IROFS components associated with PSSC-033 are repeated in PSSC-006, 024, and 041, PSSC-033 can be administratively closed.

**2. Description of PSSC(s)**

PSSC-033, Material Maintenance and Surveillance Programs, is associated with the CAR Event Group "Corrosion". This CAR event is mapped to ISAS Event LOC-04. ISAS Event LOC-04 pertains to leaks of process solution from vessels or pipes within gloveboxes caused by mechanical failure, seal/packing failure, or corrosion. The ISAS Control Groups credited as IROFS for this event include the glovebox, very high depressurization (VHD) exhaust system, and process vessels and pipes.

The ISAS Control Groups mapped to PSSC-033, "Material Maintenance and Surveillance Programs", are "Glovebox", "Process Vessels and Pipes", and "VHD System". As provided in LA Table 17-1, *PSSC Completion (not including criticality IROFS)*, there are three ISAS IROFS Control Groups associated with PSSC-033, each with a unique identifier assigned for tracking purposes. These ISAS Control Groups are designated as PSSC-033-001, PSSC-033-002, and PSSC-033-003. As presented in LA Table 17-1, the scope of PSSC-033-001 is included in the scope of PSSC-024-001, the scope of PSSC-033-002 is included in the scope of PSSC-041-001, and the scope of PSSC-033-003 is included in the scope of PSSC-006-015. As such, the IROFS components associated with PSSC-033 will be captured during the completion of other PSSCs.

### **3. NRC Independent Verification Plan (IVP) Discussion**

Independent Verification Plan (IVP) -002, entitled "Confinement Systems" was prepared to guide the NRC staff's completion of the PSSC. The original draft MOX Services scoping document for PSSC-033, which was the basis for the IVP, noted all IROFS components related to that PSSC. Since the IROFS from PSSC-033 have been consolidated into the other identified PSSCs, the closure of PSSC-033, does not impact the scope of or verification activities to be performed by the staff since the IROFS component identification has not changed.

### **4. IROFS Evaluated from IVP**

As discussed above, the scope of PSSC-033 is included in the scope of other PSSCs. As such, the IROFS components associated with PSSC-033 will be captured during the completion of other PSSCs. Therefore, as the scope of PSSC-033 is included in other PSSCs, PSSC-033 does not need to be evaluated separately.

### **5. Review of Vendor activity(s)**

N/A

### **6. Level of Inspection Effort**

N/A

### **7. Inspection Activities**

The following inspection activities were performed:

#### **7.1. Regional Inspections**

No Regional Inspection activities were needed to verify this PSSC.

#### **7.2. Resident Inspector Activities**

No Resident Inspection activities were needed to verify this PSSC.

#### **7.3. Headquarters Verification Activities**

No headquarters reviews of procedures were needed to verify this PSSC.

## **8. Other Supporting activities**

No other supporting activities were needed to verify completion of this PSSC.

## **9. Summary of Verification Activities**

MOX Services basis for completion of the scope of PSSC-033 is that IROFS from this PSSC are included in the scope of other PSSCs. As such, the IROFS components associated with PSSC-033 will be captured during the completion of other PSSCs. Therefore, as the scope of PSSC-033 is included in other PSSCs, PSSC-033 is administratively closed.

Since the PSSC safety functions associated with the Material Maintenance and Surveillance Programs have been consolidated into other PSSC's, there are no IROFS components or administrative controls associated with PSSC-033.

Therefore the staff has completed its verification of PSSC-033 and has concluded that, as per 10 CFR 70.23(a)(8), that it is completed in accordance with the application.

## **10. References**

- 10.1 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility Integrated Safety Analysis Summary," January 2018.
- 10.2 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility License Application," January 2018.
- 10.3 NRC Independent Verification Plan 007. "Emergency Systems" (Revision 0)," September 23, 2011.
- 10.4 CB&I AREVA MOX Services letter entitled "10 CFR 70.23 (a)(8) Completion Process," dated December 21, 2015.
- 10.5 CB&I AREVA MOX Services. "PSSC-033 Completion Letter," dated May 9, 2018, 2017.
- 10.6 Construction Authorization Request, February 2005.

**MOX FUEL FABRICATION FACILITY  
PRINCIPAL STRUCTURES, SYSTEMS AND COMPONENTS  
COMPLETION VERIFICATION REPORT**

**PSSC-040**

**Pressure Vessel Controls**

**1. CB&I AREVA MOX Services (MOX Services) Completion Letter**

MOX Services submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) on December 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15362A554) which committed to submitting Principal Structure, System and Components (PSSCs) completion letters to the NRC to provide timely notification to support the staff's finding as required in Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 70.23(a)(8). The PSSC completion letters were to be based on their internally prepared PSSC completion packages. This letter also included a crosswalk that correlated the Construction Authorization Request (CAR) PSSCs to the Items Relied on for Safety (IROFS) in the Integrated Safety Analyses Summary (ISAS).

On May 9, 2018, MOX Services submitted a letter notifying the NRC that that they believe that the PSSC-040 (Pressure Vessel Controls) is complete in accordance with the application in support of the regulatory requirements in 10 CFR 70.23(a)(8) subject to verification by the NRC.

MOX Services basis for completion of PSSC-040 is that the safety functions derived from the CAR are not required to be credited in the ISAS in order to meet 10 CFR Section 70.61 requirements and there are no IROFS components associated with PSSC-040.

**2. Description of PSSC(s)**

PSSC-040, Pressure Vessel Controls, is associated with the CAR Event Group "Pressure Vessel Over-Pressurization". The safety function of the pressure vessel controls is to ensure primary confinements are protected from the impact of pressure vessel failures (bulk gas, breathing air, service air and instrument air systems). The CAR event description is entitled "Pressure Vessel Overpressurization Explosion". This CAR event is mapped to ISAS Event EXP-09.

Failure of an auxiliary pressure vessel or compressed gas bottle that does not contain radioactive materials is postulated to occur which provides an explosive release of stored energy. The ISAS concludes that no IROFS have been identified for this event. The performance requirements of 10 CFR 70.61 are met by prevention of the event by design. A pressure vessel or gas bottle failure event located in the same area as IROFS could interact with an IROFS and potentially impact the IROFS safety function. The compressed gas program procedures and seismically qualified passive failure protection features are used to prevent this potential interaction. Pressure vessels are either judged to have insufficient energy to cause degradation of IROFS, or the implementation of the compressed gas program and use of seismically qualified passive failure protection features (e.g., seismically qualified bottle racks) prevent the potential interaction.



### **3. NRC Independent Verification Plan (IVP) Discussion**

Independent Verification Plan (IVP) -024, entitled "Pressure Vessel Controls" was prepared to guide the NRC staff's completion of the PSSC. The original draft MOX Services scoping document for PSSC-040, which was the basis for the IVP, noted that there are no IROFS components related to this PSSC.

### **4. IROFS Evaluated from IVP**

MOX Services provided the following strategy in its LA: Failure of an auxiliary pressure vessel or compressed gas bottle that does not contain radioactive materials is postulated to occur which provides an explosive release of stored energy. The ISAS concludes that no IROFS have been identified for this event. The performance requirements of 10 CFR 70.61 are met by prevention of the event by design. A pressure vessel or gas bottle failure event located in the same area as IROFS could interact with an IROFS and potentially impact the IROFS safety function. The compressed gas program procedures and seismically qualified passive failure protection features are used to prevent this potential interaction. Pressure vessels are either judged to have insufficient energy to cause degradation of IROFS, or the implementation of the compressed gas program and use of seismically qualified passive failure protection features (e.g., seismically qualified bottle racks) prevent the potential interaction.

This safety strategy was reviewed and approved by the NRC as documented in Section 11.7.6.2 of the *Final Safety Evaluation Report for the License Application To Possess and Use Radioactive Material at the Mixed Oxide Fuel Fabrication Facility in Aiken, SC*.

### **5. Review of Vendor activity(s)**

N/A

### **6. Level of Inspection Effort**

N/A

### **7. Inspection Activities**

The following inspection activities were performed:

#### **7.4. Regional Inspections**

No Regional Inspection activities were needed to verify this PSSC.

#### **7.5. Resident Inspector Activities**

No Resident Inspection activities were needed to verify this PSSC.

#### **7.6. Headquarters Verification Activities**

No headquarters reviews of procedures were needed to verify this PSSC.

## **8. Other Supporting activities**

No other supporting activities were needed to verify completion of this PSSC.

## **9. Summary of Verification Activities**

MOX Services basis for completion of the PSSC-040 is that there are no IROFS associated with this PSSC. Based on the review of the LA as documented in Section 11.7.6.2 of the *Final Safety Evaluation Report for the License Application to Possess and Use Radioactive Material at the Mixed Oxide Fuel Fabrication Facility in Aiken, SC*, the staff agrees that there are no IROFS components associated with PSSC-040. Therefore the staff has completed its verification of PSSC-033 and has concluded that, as per 10 CFR 70.23(a)(8), that it is completed in accordance with the application.

## **10. References**

- 10.7 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility Integrated Safety Analysis Summary," January 2018.
- 10.8 CB&I AREVA MOX Services. "Mixed Oxide Fuel Fabrication Facility License Application," January 2018.
- 10.9 NRC Independent Verification Plan 024. "Pressure Vessel Controls" (Revision 0)," September 25, 2011.
- 10.10 CB&I AREVA MOX Services letter entitled "10 CFR 70.23 (a)(8) Completion Process," dated December 21, 2015.
- 10.11 CB&I AREVA MOX Services. "PSSC-040 Completion Letter," dated May 9, 2018, 2017.
- 10.12 Construction Authorization Request, February 2005.