UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

September 30, 2016

Dr. Ronald J. Land
Site Manager
AREVA NP, Inc.
2101 Horn Rapids Road
Richland, WA 99354-0130

SUBJECT: AREVA NP, INC. (RICHLAND) – NUCLEAR REGULATORY COMMISSION INSPECTION REPORT NO. 70-1257/2016006 AND NOTICE OF VIOLATION

Dear Dr. Land:

The Nuclear Regulatory Commission (NRC) conducted an announced inspection during the week of August 29, 2016, at the AREVA NP, Inc., facility in Richland, Washington. The purpose of the inspection was to perform Temporary Instruction (TI) 2600/16, Inspection of Activities Associated with NRC Generic Letter 2015-01, Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities. The enclosed report presents the results of the inspection. At the conclusion of this inspection, the results were discussed with you and members of your staff at an exit meeting on September 1, 2016.

During the inspection, NRC staff examined activities conducted under your license as they related to public health and safety, and to confirm compliance with the Commission's rules and regulations, and with the conditions of your license. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

The inspection allowed the staff to independently verify compliance with regulatory requirements and applicable license conditions regarding the treatment of natural phenomena hazards (NPH) as described in your Integrated Safety Analysis (ISA).

Based on the results of the inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred for failure to establish management measures to ensure that an IROFS would be reliable and available to perform its intended function if needed to meet the performance requirements. This violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at (http://www.nrc.gov/about nrc/regulatory/enforcement/enforce pol.html). The violation is cited in the enclosed Notice of Violation (NOV) because the NRC identified the violation. The NOV and the circumstances surrounding them are described in detail in the subject inspection report.

You are required to respond to the violation and should follow the instructions specified in the enclosed NOV when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the NOV. The NRC review of your response to the NOV will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

If you contest the violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region II and (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of NRC's "Rules of Practice and Procedure," a copy of this letter and enclosure will be made available electronically for public inspection in the NRC Public Document Room, or from the NRC's Agencywide Documents Access and Management System (ADAMS), which is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please call me at (404) 997-4703.

Sincerely,

/RA/

Omar R. López-Santiago, Chief
Safety Branch
Division of Fuel Facility Inspection

Docket No. 70-1257
License No. SNM-1227

Enclosures:
1. Notice of Violation
2. NRC Inspection Report 70-1257/2016006
   w/Supplementary Information

cc: (See page 3)

You are required to respond to the violation and should follow the instructions specified in the enclosed NOV when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the NOV. The NRC review of your response to the NOV will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

If you contest the violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region II and (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of NRC's "Rules of Practice and Procedure," a copy of this letter and enclosure will be made available electronically for public inspection in the NRC Public Document Room, or from the NRC's Agencywide Documents Access and Management System (ADAMS), which is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please call me at (404) 997-4703.

Sincerely,

/RA/
Omar R. López-Santiago, Chief
Safety Branch
Division of Fuel Facility Inspection

Docket No. 70-1257
License No. SNM-1227

Enclosures:
1. Notice of Violation
2. NRC Inspection Report 70-1257/2016006
   w/Supplementary Information

cc: (See page 3)

DISTRIBUTION:
T. Vukovinsky, RII
G. Goff, RII
E. Michel, RII
M. Baker, NMSS
L. Cuadrado, NMSS
R. Johnson, NMSS
PUBLIC

☒ PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE ☐ SENSITIVE ☒ NON-SENSITIVE

ADAMS: ☒ Yes ACCESSION NUMBER:_____ ☒ SUNSI REVIEW COMPLETE ☐ FORM 665 ATTACHED

OFFICE	RII:DFFI	RII:DFFI	NMSS	NMSS	RII:DFFI	RII:DFFI	
SIGNATURE	**BJA1**	**JWM2**	**JML5**	**PXK2**	**NAP2**	**ORL**	
NAME	BADKINS	JMUNSON	JMARCANO	PKOCH	NPITONIAK	OLOPEZ	
DATE	9/30/2016	9/28/2016	9/29/2016	9/29/2016	9/30/2016	9/30/2016	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: S:\DFFI NEW\SAFETY BRANCH\AREVA 2016-006 NPH.DOCX

cc:
Loren J. Maas, Manager
Licensing and Compliance
AREVA NP, Inc.
2101 Horn Rapids Road
Richland, Washington 99354

Calvin D. Manning, Manager
Nuclear Criticality Safety
AREVA NP, Inc.
2101 Horn Rapids Road
Richland, Washington 99354

Timothy J. Tate, Manager
Environmental, Health, Safety & Licensing
AREVA NP, Inc.
2101 Horn Rapids Road
Richland, Washington 99354

David Jansen, Director
Office of Radiation Protection
Department of Health
PO Box 47827
Olympia, Washington 98504-7827
david.jansen@doh.wa.gov

Earl Fordham, Deputy Director
Office of Radiation Protection
Department of Health
309 Bradley Boulevard, Suite 201
Richland, Washington 99352

NOTICE OF VIOLATION

AREVA NP, Inc.
Richland, WA

Docket Number (No.) 70-1257
License No. SNM-1227

During an NRC inspection conducted from August 29 through September 1, 2016, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

10 CFR 70.61(e) states, in part, the safety program established and maintained pursuant to §70.62 of this subpart, shall ensure that each item relied on for safety (IROFS) will be available and reliable to perform its intended function when needed and in the context of the performance requirements of this section.

10 CFR 70.62(d) requires, in part, that each licensee shall establish management measures to ensure compliance with the performance requirements of §70.61. The management measures shall ensure that engineered and administrative controls and control systems that are identified as IROFS pursuant to §70.61(e) are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of §70.61.

Section 11.0, “Management Measures,” Subsection 11.1.1, “CM Policy,” of License Application SNM-1227 states, in part, “The CM process provides assurance that consistency is established and maintained between facility design, operational requirements, physical configuration, and facility documentation.”

Section 11.0, “Management Measures, Subsection 11.4, Procedures Development and Implementation,” of License Application SNM-1227 requires, in part, “activities involving licensed Special Nuclear Material (SNM) and/or IROFS will be conducted in accordance with approved procedures.”

MCP-30379, Management Control Procedure Operations Projects - Manufacturing Engineering Procedures Construction or Modification Change Control, Section 5.5, Engineering Change Notice, states, in part, “The Project Engineer shall arrange for all permits and inspections, schedule training for all contractors, and ensure that paperwork is complete and signed and that all required postings are in place.”

Contrary to the above, on and before September 1, 2016, the licensee failed to establish management measures to ensure that IROFS would be available and reliable to perform their intended function when needed in order to comply with the performance requirements. Specifically, the licensee (1) failed to ensure that the seismic design for the Mount Athos Road fuel storage racks was consistent with the installed physical configuration and (2) the Project Engineer failed to arrange for anchor bolt installation inspections and ensure that the Engineering Change Notice paperwork was complete. This SLIV violation will be documented as VIO 70-1257/2016-006-01, Failure to Implement Adequate Management Measures for the Installation of Fresh Fuel Bundle Storage Racks.

This is a Severity Level IV violation (Section 6.2.d.1).

Pursuant to the provisions of 10 CFR 2.201, AREVA NP, Inc., is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with copies to the Regional Administrator, Region II, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agency wide Document Access and Management system (ADAMS), accessible from the NRC Web Site at http://www.nrc.gov/reading-rm/adams.html to the extent possible, it should not include any personal privacy, proprietary, classified, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withhold and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 30th day of September, 2016

U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.:	70-1257
License No.:	SNM-1227
Report No.:	70-1257/2016-006
Licensee:	AREVA NP, Inc.
Facility:	Richland Facility
Location:	Richland, Washington 99354
Dates:	August 29 through September 1, 2016
Inspectors:	B. Adkins, Senior Fuel Facility Inspector (Sections A.3, A.6, and A.7) J. Munson, Fuel Facility Inspector (Sections A.5) J. Marcano, Structural Engineer (Sections A.1, A.2, A.3, and A.4) P. Koch, Structural Engineer (Sections A.1, A.2, A.3 and A.4) A. Chowdhury, Structural Engineer Contractor (Sections A.1 and A.2)
Approved by:	O. López-Santiago, Chief Safety Branch Division of Fuel Facility Inspection

EXECUTIVE SUMMARY

AREVA NP, INC. - Richland
NRC Inspection Report 70-1257/2016-006
August 29 through September 1, 2016

The inspection implemented Temporary Instruction (TI) 2600/16, Inspection of Activities Associated with Nuclear Regulatory Commission (NRC) Generic Letter 2015-01, Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities. The purpose of the inspection was to independently verify that licensees are in compliance with regulatory requirements and applicable license conditions regarding the treatment of natural phenomena hazards (NPH) events as described in the Integrated Safety Analysis (ISA). The inspection was conducted by NRC regional inspectors and headquarters (HQ) technical staff during normal shifts in areas of structural engineering, chemical safety, nuclear criticality safety, fire protection, and emergency preparedness. The inspectors performed a selective examination of license activities that were accomplished by direct observation of safety-significant activities and equipment, tours of the facility, interviews and discussions with licensee personnel, and a review of facility records.

Assessment of the Potential Accident Sequences, Consequences, and Prevention and/or Mitigation Strategies as a Result of Impacts to Facility Structures and Internal Components from NPH

With the exception of one documented violation (VIO), the licensee's ISA adequately considered credible events involving:

- Seismic-induced failure of principal buildings (Paragraph A.1);
- Seismic-induced failure of principal internal equipment (Paragraph A.2);
- Seismic-induced fire/explosion (Paragraph A.3);
- High winds and tornadoes (Paragraph A.4)
- NPH-induced criticality (Paragraph A.5);
- Flooding (Paragraph A.6); and
- Other NPH events including volcanoes, rangeland fires, and lightning. (Paragraph A.7)

One Severity Level (SL) IV VIO of NRC requirements was identified for failure to establish management measures to ensure that an item relied on for safety associated with the fresh fuel storage racks would be available and reliable to perform its intended function when needed in order to comply with performance requirements.

Special Topics

- Closure of Unresolved Item (URI) 2012-006-01, "Further evaluate whether the licensee is in compliance with the requirements of 70.62(c) and 70.61 performance requirements regarding natural phenomena events accident sequences." (Paragraph B.1).

REPORT DETAILS

Summary of Plant Status

The AREVA-Richland facility (AREVA) converts uranium hexafluoride (UF_6) into uranium dioxide (UO_2) for the fabrication of low-enriched fuel assemblies used in commercial light water reactors.

The inspection implemented Temporary Instruction (TI) 2600/16, Inspection of Activities Associated with Nuclear Regulatory Commission (NRC) Generic Letter 2015-01, Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities. The purpose of the inspection was to independently verify that licensees are in compliance with regulatory requirements and applicable license conditions regarding the treatment of natural phenomena hazards (NPH) events as described in the Integrated Safety Analysis (ISA). The inspection was conducted by NRC regional inspectors and headquarters (HQ) technical staff during normal shifts in areas of permanent plant modifications, chemical safety, nuclear criticality safety, fire protection, and emergency preparedness. The inspectors performed a selective examination of license activities that were accomplished by direct observation of safety-significant activities and equipment, tours of the facility, interviews and discussions with licensee personnel, and a review of facility records.

A. Assessment of the Potential Accident Sequences, Consequences, and Prevention and/or Mitigation Strategies as a Result of Impacts to Facility Structures and Internal Components from NPH

1. Seismic-Induced Failure of Principal Buildings

a. Inspection Scope and Observations

The ISA stated that the buildings and associated equipment at its Richland site were designed and constructed to comply with the Uniform Building Code (UBC) and the International Building Code (IBC) criteria for the year of construction. AREVA credited, as an Item Relied on for Safety (IROFS) #0.24, that the building and equipment at the facility are designed and constructed according to the applicable codes. AREVA conducted seismic calculations or recalculations for the principal buildings to demonstrate that the design bases for these buildings were sufficient to prevent significant damage after a seismic event. The calculations established that there will be no accident sequences that will be caused by the damage and collapse of AREVA facility principal buildings under seismic loads. The inspectors conducted walk downs; reviewed the design bases, calculations, and design drawings of a sample of buildings and interviewed the structural engineer. The sample buildings included UO_2 building and building additions, dry conversion facility building (DCF), and engineering laboratory operations (ELO) building.

The inspectors reviewed the specifications developed by AREVA in 1970 for process buildings and the original design analysis of the UO_2 building that was constructed in 1970. The inspectors verified that the UO_2 building was analyzed and designed according to the Seismic Zone 2 criteria of the UBC for the year of its construction and that an adequate methodology was used to evaluate its capacity under the design basis seismic load.

The inspectors reviewed the design criteria, structural analysis, and design drawings of UO_2 building additions: (1) 1973 UO_2 south end expansion, (2) UO_2 building UF_6 expansion year 1976, (3) UO_2 powder storage building year 1992, (4) UO_2 building expansion laboratory addition year 1993, (5) UO_2 building expansion BLEU conversion complex addition completed in 2004, (6) UO_2 building expansion BLEU bundle storage addition completed in 2004, and (7) UO_2 building expansion rod to bundle addition year 2007. The inspectors reviewed the design criteria used for the building additions (1) through (4) to determine whether these expansions were designed according to the Seismic Zone 2 criteria of the UBC for the year of their construction. Similarly, the inspectors reviewed the design criteria used for the building additions (5) through (7) to determine if these expansions were designed according to the IBC seismic group 2 and site class D criteria for the year of their construction. The inspectors reviewed the design drawings and the calculations or recalculations of these addition buildings to evaluate whether the calculations or recalculations were consistent with the designed buildings and were appropriately performed. The inspectors also verified that these building expansions will not sustain any significant damages under design basis seismic load. The inspectors noted that UO_2 building additions (1), (2), and (4) went through recalculations. In the case of building addition (3), the inspectors also reviewed the seismic structural calculations for regular storage racks and powder drum storage racks to evaluate that they will remain structurally stable under design basis seismic load.

The inspectors reviewed design criteria and original structural analyses or seismic re-evaluations for the 1995 Dry Conversion Facility, 1974 Engineering Laboratory Operations building, and 1982 Engineering Laboratory Operations building addition. The DCF was designed according to UBC-1991 as a Special Occupancy Structure in Seismic Zone 2B. For the Dry conversion Facility, the original structural design calculations were reviewed. Limited seismic re-evaluations were reviewed for the Engineering Laboratory Operations building and building expansion. The 1974 Engineering Laboratory Operations building was re-evaluated using the 1970 UBC, and the 1982 building addition was re-evaluated using UBC-1979. These calculations and re-evaluations were consistent with the codes of record used for the design and construction of each structure.

b. Conclusion

No violations of NRC requirements were identified.

2. Seismic-Induced Failure of Principal Equipment

a. Inspection Scope and Observations

The ISA stated that the buildings and associated equipment at its Richland site were designed and constructed to comply with the UBC and the IBC criteria for the year of construction. AREVA credited that the building and equipment at the facility are designed and constructed according to the applicable codes (IROFS #0.24). The inspectors selected a sample of major equipment and performed area walk downs to ensure that the licensee's evaluation of the equipment reflected the actual as-built configuration. The inspectors walked down the following equipment at the UO_2 and DCF buildings: UF6 cylinders (autoclaves), Pyrohydrolysis vessels, calciners, powder blenders, powder preparation equipment, hydrogen fluoride pipe lines, powder storage racks, and the fresh fuel bundle storage racks. In addition to performing building walk-downs, the inspectors reviewed samples of the structural analysis for building

components to verify that the design methods for seismic loads were consistent with applicable building codes.

Failure to Implement Adequate Management Measures for the Installation of Fresh Fuel Bundle Storage Racks

Introduction: An NRC-identified Severity Level (SL) IV violation of 10 CFR 70.62(d) was identified for the licensee's failure to adequately implement management measures to ensure that engineered controls identified as IROFS were available and reliable to perform their function when needed. This violation is cited because it was NRC identified and the licensee does not have an approved corrective action program as defined in Section 2.3.2 of the NRC Enforcement Policy.

Description: During walk downs of the fuel storage bundle racks the inspectors noted that the supports of racks in the UO_2 Ceramics building had inconsistencies with regards to the anchor bolts pattern and number of anchor bolts at the base. The fuel bundle storage racks are steel structures of approximately 3 feet wide, 9 feet long and 15 feet height. Each rack supports five fuel assemblies on each side. The fuel assemblies weight approximately 1,760 pounds each. The weight of the fuel assemblies is supported at the bottom by a steel support. The racks included top and bottom supports to prevent the fuel assemblies from being dislodged. The rack is bolted to the concrete slab on grade by the use of a steel base plate and anchors.

The inspectors reviewed the structural calculations performed by contractors for the specification of the anchor bolts at the base of the racks. The calculations used the IBC 2009, the ASCE 7-05, and ACI 318-08 to calculate the seismic forces resisted by the anchor bolts. The analysis methodology calculated the seismic base shear for the racks by using an Importance Factor of 1.5 and a response modification coefficient of 3.25. The results of the calculation were used as input to the HILTI PROFIS software for the design of the anchor bolts. The specification by the structural contractor was to install HILTI Kwik-Bolt TZ anchors with ½" diameter and a minimum embedment of 3¼" or HILTI HIT-HY 150 MAX-SD adhesive bolts with a minimum embedment of 3 ½". The structural contractor also specified that a special inspection of the anchor installation was required.

The inspectors noted that the as-built configuration of the base of the racks and the pattern of the anchor bolts did not match the design calculations. The design assumed that the columns were located at the center of steel base with an axisymmetric rectangular bolt pattern and 4 anchor bolts. Specifically, the columns in the as-built configuration were not centered on the base plate and the pattern of the anchor bolts varied. Columns not centered on the base plate induce eccentricity effects with the potential to increase forces on anchor bolts. Similarly, differences in the bolt pattern could increase forces on the anchor bolts.

AREVA commissioned a new calculation to evaluate the as-built configuration. The evaluation assumed ½" diameter adhesive bolts based on observation. The evaluation also assumed the anchors used were HILTI HIT-HY 150 MAX-SD adhesive bolts with a minimum embedment of 3 ½" which the licensee was unable to verify. This new evaluation included the eccentricity of the column framing into the base plate and the dimensions of the installed base plate. The calculations used the IBC 2015 and the ASCE 7-10 to re-calculate the seismic base shear. The methodology calculated the seismic base shear for the racks by using an Importance Factor of 1.25 which reduced

the applied loads by a factor of 25 percent and a response modification coefficient of 6 as allowed by the ANSI MH16.1 section 2.6.3. Even though the demands were lower than those used for the original calculation, the results identified that the critical failure mode of the bond strength of the bolt anchor adhesive is stressed to 92% of its capacity. The inspectors also questioned whether the analysis accounted for the asymmetric, staggered positioning of the anchor bolts. The inspectors determined that the results of the evaluation were not conservative because the analysis did not consider the staggered bolt pattern. The licensee revised their analysis to account for this condition and noted that the anchor bond strength increased from 92% to 94% of its capacity, but still met the required building code criteria of less than 100%.

The inspectors reviewed installation and procurement records for the anchors bolts. Procedure MCP-30379 required AREVA to develop an engineering change notice (ECN) for the installation of fuel storage racks. Upon review, the inspectors noted the lack of records associated with the installation of the anchors bolts. There was no documentation that showed completion of the special inspection required by the structural contractor's specification for the installation of the bolts. Also, there was no documentation (installation instructions or drawings) to show the details of the bolts used, embedment depth of the anchor bolts, adhesive used, torque applied to the anchor bolts, or records of the training for the installation personnel as typically specified by HILTI. This inspector-identified issue was discussed with AREVA and the structural contractor.

The inspectors concluded that the failure to provide adequate installation instructions and perform the required inspections was significant due to the small available margin between the calculated bond strength and available capacity (6%), and the fact that certain design requirements, including embedment depth and cleanliness, could not be verified. The safety function of the fuel bundle storage rack is to secure the fuel assemblies in place for seismic loads up to the design basis earthquake. The licensee relied on the design and construction of the facility and associated equipment to withstand design basis earthquake without experiencing significant facility damage or loss of existing geometry control. The licensee entered this condition into their corrective action system as Condition Report 2016-5774.

Analysis: As required by 10 CFR 70.61(e) and 70.62(d), the licensee failed to adequately implement management measures to ensure that engineered controls identified as IROFS were available and reliable to perform their function when needed. Specifically, the licensee (1) failed to ensure that the seismic design for the Mount Athos Road fuel storage racks was consistent with the installed physical configuration and (2) the project engineer (PE) failed to arrange for anchor bolt installation inspections and ensure that the ECN paperwork was completed.

This issue was determined to be more than minor because it aligned with Inspection Manual Chapter (IMC) 0616 Appendix B screening criteria 7, which states, "does the noncompliance involve the failure of a management measure such that an IROFS would not be available or reliable to perform its intended safety function when needed as required by 10 CFR 70.61(e) and 70.62(d) and is it risk significant?" Specifically, failure to properly install and inspect the concrete anchors had the potential to adversely impact nuclear safety, specifically the ability of the anchors to withstand a credible seismic event. Based on the failure to perform the required inspections, the inspectors determined that the ability of the anchors to withstand a seismic event was indeterminate. The inspectors also noted that there is minimal margin (6%) between the

calculated seismic loading of the anchors and the code allowable bond strength. Based on the low available margin and indeterminate condition, the inspectors concluded that there was more than an insignificant or negligible impact on risk as a result of the noncompliance.

The inspectors concluded that there was no actual safety significance because no seismic event or criticality occurred.

With respect to the ISA, the potential safety significance of this issue is considered low because the licensee continued to meet 10 CFR 70.61 performance requirements. Based on the licensee's ISA, the storage racks are credited as an IROFS (#5005) in accident sequence 540-7, which stated that the fuel racks are designed and constructed with restraints sufficient to prevent fuel assemblies from being dislodged from their storage locations in a seismic event of magnitude UBC 2B or less. The inspectors concluded that the overall risk of the accident sequence increased as a result of the noncompliance (e.g., risk index was reduced from a -8 to a -6). An initiating event frequency of -2 remained since the initiating event did not occur, and IROFS #3303, moderation control, remained reliable and available to perform its intended safety function (-3). The credit for IROFS #5005 was reduced from a -3 to -1 because certain design requirements such as embedment depth and cleanliness could not be verified. The inspectors concluded that the noncompliance was more than a slight impact on overall risk because (1) it involved a degraded passive engineered control which is considered to be more risk significant than a degraded active engineered or administrative control, (2) there was minimal margin between the calculated seismic loading and bond strength capacity of the anchor bolts, (3) certain design requirements, such as embedment depth and cleanliness, could not be verified, and (4) only one IROFS remained for the prevention of seismic-induced criticality. In accordance with Section 6.2.d.1 of the NRC Enforcement Policy, the violation meets the threshold for a Severity Level IV (SLIV) violation. Specifically, under 10 CFR Part 70, Subpart H, the licensee failed to meet the requirements of 10 CFR 70.61, "Performance Requirements," or Appendix A, "Reportable Safety Events," to 10 CFR Part 70, and the failure did not result in a SL I, II, or III violation.

Enforcement: 10 CFR 70.61(e) states, in part, the safety program established in 70.62 of this subpart, shall ensure that each item relied on for safety (IROFS) will be available and reliable to perform its intended function when needed and in the context of the performance requirements of this section.

10 CFR 70.62(d) requires, in part, that each licensee shall establish management measures to ensure compliance with the performance requirements. These measures shall ensure that IROFS will be available and reliable to perform its intended function when needed in order to comply with performance requirements.

Section 11.0, "Management Measures," Subsection 11.1.1, "CM Policy," of License Application SNM-1227 states, in part, "The CM process provides assurance that consistency is established and maintained between facility design, operational requirements, physical configuration, and facility documentation."

Section 11.0, "Management Measures, Subsection 11.4, Procedures Development and Implementation," of License Application SNM-1227 requires, in part, "activities involving licensed Special Nuclear Material (SNM) and/or IROFS will be conducted in accordance with approved procedures." MCP-30379, Management Control Procedure Operations

Projects - Manufacturing Engineering Procedures Construction or Modification Change Control, Section 5.5, Engineering Change Notice, states, in part, “The Project Engineer shall arrange for all permits and inspections, schedule training for all contractors, and ensure that paperwork is complete and signed and that all required postings are in place.”

Contrary to the above, on and before September 1, 2016, the licensee failed to establish management measures to ensure that IROFS would be available and reliable to perform their intended function when needed in order to comply with the performance requirements. Specifically, the licensee (1) failed to ensure that the seismic design for the Mount Athos Road fresh fuel storage racks was consistent with the installed physical configuration and (2) the Project Engineer failed to arrange for anchor bolt installation inspections and ensure that the ECN paperwork was complete. This SLIV violation will be documented as VIO 70-1257/2016-003-01, Failure to Implement Adequate Management Measures for the Installation of Fresh Fuel Bundle Storage Racks.

b. Conclusion

One Severity Level IV violation of NRC requirements was identified for failure to meet 10 CFR 70.62 (d), Management Measures. No other violations of significance were identified.

3. Seismic-Induced Fire/Explosion

a. Inspection Scope and Observations

Based on the response to NRC Generic Letter (GL) 2015-01, Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities, the licensee did not identify any new fire related accident sequences because systems structures and components were designed to withstand seismic loads. As part of the original ISA, the licensee evaluated the consequences from seismically induced fires and explosions and concluded that any potential failures of process equipment or piping containing flammable gases such as hydrogen, natural gas, or propane were bounded by existing accident sequences. The inspectors reviewed a sampling of existing ISA accident sequences to determine if the sequences remained valid during a credible NPH event.

The inspectors conducted walk downs of hydrogen, natural gas, propane, and water shutoff valves with the system engineer and noted that there were numerous isolation points located both inside and outside of the various process buildings. Isolation points consisted of manual valves, double block and bleed valves, excess flow valves, and pushbutton kill switches. The inspectors concluded that there were multiple methods to shutoff flammable gases and water supplies if needed following an NPH event.

The inspectors reviewed the technical documentation for the IROFS sprinklers 4535 and 4535.10 in Warehouse 2 and the Specialty Fuels Building. The inspectors reviewed the drawings with the design specifications and installation instructions for the seismic restraints of the sprinklers. In addition, the inspectors performed walk down to verify that piping was securely installed and was constructed to applicable NFPA/building codes.

The inspectors also conducted a walk down of fire doors and fire walls in various buildings containing SNM to verify proper operations and that required inspections were completed. The purpose of the fire doors and walls were to prevent a small from

spreading to a large fire following an NPH event. The fire doors and walls were expected to remain in-place and functional following a seismic event based on the results of the seismic analysis for the site buildings.

The inspectors reviewed applicable emergency preparedness procedures to determine if the licensee identified adequate response actions to isolate flammable gases and hazardous energy sources in the event of an earthquake. The inspectors noted that the procedures contained generic steps to isolate hazardous sources, but did not contain maps or locations of isolations points, or require specific training to demonstrate that personnel can locate and isolate the sources in a timely manner. Also, the inspectors noted that the shutoff valves were not specifically labeled to aid personnel in locating valves in a timely manner during an emergency. These weaknesses were previously identified by the licensee in condition report 2012-9934 following Fukushima earthquake and Tsunami; however, the actions remain incomplete. The licensee stated that the actions are scheduled to be complete by the end of the 2016. In addition, the condition report contained additional recommendations to improve the licensee's ability to respond to an NPH event. Many of the recommendations were implemented including:

- Established a calculation that shows the extent of damage to a UF_6 cylinder in the event of a building collapse;
- Ensured there were adequate isolation valves for process/sanitary water, nitric acid, hydrogen, natural gas, and power for multiple buildings;
- Added additional safety showers and eye wash stations;
- Increased the size of catch pans around various oil and solvent tanks
- Trained control room operators to evacuate upon HF strobe light signal
- Installed cameras in HF tank farm
- Purchased new foam generators to minimize evaporation and chemical exposures from a chemical spill;
- Established water demand needed to fight a fire on sight after an NPH event;
- Provided a block and bleed vent system on SWUR flammable gas supply;

The inspectors noted that these enhancements were not required by NRC regulation, but were good practices to prepare for a possible NPH event. The licensee stated that they also plan to conduct a drill that requires emergency response team members to isolate power, gas, or liquid supplies in the process buildings.

b. Conclusion

No violations of NRC requirements were identified.

4. High Winds and Tornadoes

a. Inspection Scope and Observations

The ISA stated that the facilities at the AREVA Richland Facility were designed and constructed in accordance with the UBC to withstand sustained winds of 80 mph without appreciable damage. The inspectors reviewed a sample high winds calculations including a review of the design criteria, original structural design analyses or re-evaluations performed by AREVA. The sample calculations reviewed included the design criteria for high winds based on the building code of record and with wind speeds in the range of 80 mph. The re-calculations performed by AREVA also included the

design criteria for wind as stated above. For some of the calculations, like the UO_2 building, the forces applied horizontally from seismic loads were compared to the high wind forces to demonstrate that seismic loads governs the design.

The inspectors reviewed emergency response procedures related to high wind/tornado. The procedures required the licensee to perform various actions depending on whether a tornado was expected (e.g. tornado warning) or a tornado had occurred. Some examples of potential protective actions included: (1) shelter in-place, (2) secure loose material for prevention of missiles, (2) protect emergency response equipment, (3) isolate water, hazardous material, and flammable gas lines into the building, and (4) evacuate personnel in the event that the tornado results in a radiological or chemical release.

b. Conclusion

No violations of significance were identified.

5. NPH-Induced Criticality

a. Inspection Scope and Observations

The inspectors evaluated the adequacy of the licensee's nuclear criticality safety (NCS) program and analyses to assure the safety of fissile material operations and compliance with respect to NPH events. The inspectors reviewed select NCS documents (listed in Section 4.0 of the Attachment). The inspectors verified the technical basis for NCS limits and assumptions, evaluated potential NPH-related criticality accident sequences, and verified that the licensee performed evaluations to assure sub-criticality of processes under all normal and credible abnormal conditions.

The inspectors reviewed NCS evaluations and analyses to determine whether the licensee evaluated normal and credible abnormal conditions for NCS, reviewed the associated criticality accident sequences, reviewed the purpose and technical basis for any controls implemented to prevent these criticality accident sequences, verified that controls identified to prevent these criticality accident sequences would be effective and independent, verified that these controls were installed and/or implemented as intended, and evaluated whether the likelihood of these accident sequences was limited to regulatory limits.

During the review of NPH-related accident sequences, the inspectors identified that initiating event frequencies, probabilities of failure on demand, and likelihood designations were not applied consistently. In some cases, the licensee's ISA indicated that criticality was highly unlikely due to the initiating event frequency alone; whereas, in other cases the licensee's ISA indicated that criticality was highly unlikely due to the existence of IROFS 0.24 (Equipment Constructed to Codes and Standards). Likewise, the licensee's ISA indicated that certain criticality accident sequences were not credible, yet specified the accident sequences as credible and assigned IROFS to limit their likelihood. The inspectors determined that the licensee adequately identified credible NPH-related accident sequences and limited their likelihood to highly unlikely, but did not document these accident sequences in the ISA such that compliance could be clearly demonstrated.

Based on this observation, the inspectors determined that this issue was a minor violation of 10 CFR 70.62(a)(2) which states, in part, [e]ach licensee or applicant shall establish and maintain records that demonstrate compliance with the requirements of [10 CFR 70.62] paragraphs (b) through (d)…." Specifically, the licensee failed to maintain records that demonstrate compliance with 10 CFR 70.62(c). This violation was determined to be minor because it represented a documentation issue and did not exceed any general or area specific screening criteria in MC 0616 Appendix B. This failure to comply with 10 CFR 70.62(a)(2) constitutes a minor violation that is not subject to enforcement action in accordance with Section 2.3.1 of the NRC Enforcement Policy. This condition was entered into their corrective action program as Condition Report 2016-5774.

The inspectors performed plant walk downs of the ammonium diuranate (ADU) and dry conversion process (DCP) areas, bundle inspection and storage areas, ELO, and various ventilation systems. The inspectors interviewed operations' staff and NCS engineers both before and during walk downs. The inspectors visually verified that controls identified in the applicable NCS evaluations were installed and/or implemented as designed. The inspectors verified that management measures designed to maintain IROFS were being performed within their assigned frequency and in accordance with procedures.

The inspectors verified that the licensee evaluated the ability of the criticality accident alarm system (CAAS) to remain operational following a seismic event.

The inspectors reviewed the Emergency Plan to ensure that mitigative actions with regard to an inadvertent criticality due to flooding and other natural phenomena were evaluated.

b. Conclusion

No violations of significance were identified. One minor violation of 10 CFR 70.62(d) was identified.

6. Flooding, Local Intense Precipitation, and Snow Loading

a. Inspection Scope and Observations

In their response to the GL, the licensee's analysis concluded that flood levels would not impact the plant manufacturing areas. The ISA Summary stated that the historical flood frequency data for the Hanford area showed that a 500 year flood from rainfall or snowmelt will not reach the facility with or without the presence of flood control dams on the Yakima, Columbia, and Snake Rivers; therefore, no credible flood-related hazards were identified which would lead to accident sequences with an unacceptable risk due to consequences of concern. In cases where the UBC or IBC applied, such as snow loading and local intense precipitation, the buildings were designed to meet UBC or IBC to withstand the prescribed limits.

The licensee concluded that the only credible flood event that could impact the AREVA site was a failure of the Grand Coulee Dam. Failure of the dam was considered to be a beyond design basis event. The inspectors reviewed the emergency response procedure that covers the response to severe floods to determine if the licensee had established adequate guidance to respond to a potential dam failure. The procedure

stated that the site will be flooded under 17 ft. of water within 24 hours. The procedure required that all open SNM be placed into closed containers and immediate site evacuation of site personnel. The inspectors concluded that a flood of this magnitude would not be a concern for workers since there would be ample time to evacuate the facility prior to a flood of this magnitude and potential criticality.

b. Conclusion

No violations of NRC requirements were identified.

7. Other NPH Events

a. Inspection Scope and Observations

Other reviewed NPH Events included landslides, volcanoes, rangeland fires, and lightning were evaluated in the ISA. The licensee considered the potential hazards and either determined that the scenarios were bounded by existing accident scenarios or concluded that there were no additional scenarios or IROFS required.

Volcanoes

The possibility of a volcanic eruption was a hazard of concern for the AREVA site due its close proximity to the cascade mountain range which includes several large volcanoes such as Mt. St. Helens, Mt. Adams, Mt. Baker, Mt. Rainier, and Glacier Peak. An eruption of one of these large volcanoes could lead to a significant ash accumulation at the site; however, no hazards of concern were identified that would lead to an acceptable consequence of concern. In the event of a volcanic rupture, the licensee has developed an emergency response procedure to assist the emergency response staff in making timely response decisions. The procedure provided steps to shut down affected equipment involving air/combustion and a decision point to shut down the facility including evacuation of non-essential personnel. The inspectors determined that the licensee would have ample time to implement the procedure before the ash could cause any potential health-related or personnel safety concerns.

Rangeland Fires

According the licensee's ISA, the natural vegetation in Southeast Washington consisted of dryland agriculture, range land, and undeveloped areas. The climate is dry, summers are hot resulting in a high potential for rangeland fires. In the response to the GL, the licensee credited that the buildings and roofs were of either metal clad or of concrete construction. Also, the natural cover vegetation did not yield a significant fire hazard to the facility structures due to the lack of surrounding forest. Therefore, based on limited vegetation and non-flammable building construction, the licensee concluded that there were no external fire-related hazards which would lead to accident sequences with consequences of concern.

In order to validate these assumptions, the inspectors conducted walk downs of the facility to verify there was a low potential for a wildfire to spread onto the facility and result in an accident of concern and that buildings and roofs were constructed of non-flammable materials. During the walk down, the inspectors noted that the dunnage used to support UF_6 cylinders was of wood construction. This was brought to the attention of the licensee for evaluation. The primary concern is that a fire involving the dunnage

could result in heating and possible rupture of a UF_6 cylinder. The inspectors noted that the amount of dunnage was not significant and it was not likely that it would result in an accident that could produce a consequence of concern.

The inspectors interviewed the site emergency preparedness coordinator to determine if the licensee has mutual aid agreements in place with Benton County and other agencies such as the Richland Fire Department to provide assistance in fighting rangeland fires. The inspectors discussed previous rangeland fires that have occurred in the area to determine what actions were taken by the licensee to either prevent and/or mitigate the fire and if requested, whether off-site agencies provided adequate assistance. The inspectors noted that there were procedures and protocols in place for general firefighting response.

Lightning

The licensee determined that the potential for a lightning strike was low; therefore, facility buildings did not include protection against lightning. The most probable consequence form a lightning strike was a loss of normal power. It is also possible, but unlikely, that a fire at the site could be initiated by lightning. In the event of a fire from a lightning strike, the licensee would invoke their existing firefighting procedures and training to combat the fire. This included support from nearby offsite agencies if requested.

b. Conclusion

No violations of NRC requirements were identified.

B. Special Topics

1. Follow-up on Previously Identified Issues

a. (Closed) Unresolved Item (URI) 2012-006-01, Further evaluate whether the licensee is in compliance with the requirements of 70.62(c) and 70.61 performance requirements regarding natural phenomena events accident sequences

Following the earthquake at the Fukushima Dai-ichi nuclear power station in March 2011, the NRC conducted TI 2600/015, Evaluation of Licensee Strategies for the Prevention and/or Mitigation of Emergencies at Fuel Facilities, in December 2011 to confirm compliance with applicable regulatory requirements and license conditions; and to evaluate licensee's readiness to address NPH events and other licensing bases events related to NPH. The NRC was unable to verify that AREVA was in compliance with their licensing basis and regulatory requirements with respect to NPH. Specifically, the inspectors could not confirm that all credible external events (accident sequences) involving process deviations or other events internal to the facility (e.g., consequential explosions, spills, and fires resulting from NPH event) were properly considered in the ISA. The inspectors opened Unresolved Item (URI) 2012-006-01, "Further evaluate whether the licensee is in compliance with the requirements of 70.62(c) and 70.61 performance requirements regarding natural phenomena events accident sequences."

Following the completion of TI 2600/015, the NRC concluded that this was a generic issue and subsequently issued NRC Generic Letter (GL) 2015-01, "Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities," in June 2015. The GL requested

licensees to provide additional information to support a determination with regard to proper evaluation of NPH impacts at fuel cycle facilities. AREVA submitted a response to the GL in September 2015 and the response was accepted by the NRC in August 2016.

During the inspection, the NRC reviewed this open URI to verify that the licensee had complied with regulatory requirements and applicable license conditions regarding the treatment of NPH events in the ISA. The results of the inspection are documented in Section A of this inspection report. Based on the inspections performed, the NRC has concluded that AREVA is in compliance with regards to the regulatory requirements specified in 10 CFR Part 70.61, Subpart H, with respect to the assessment of NPH hazards in the ISA. The NRC did, however, identify one SL IV violation for failure to meet 10 CFR 70.62(d), Management Measures. Specifically, the licensee failed to establish adequate management measures to ensure the availability and reliability of IROFS# 5005 associated with the fresh fuel assembly racks. The NRC also identified one minor violation for failure to meet 10 CFR 70.62(a)(2). Specifically, the licensee failed to adequately document accident sequences in the ISA with respect to NPH-related events. This URI is considered closed.

C. Exit Meeting

The inspection scope and results were summarized on September 1, 2016, to R. Land and staff. The inspectors received no dissenting comments from the licensee. Proprietary and security-related information were discussed but not included in the report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTAL INFORMATION

1. KEY POINTS OF CONTACT

Name	Title
B. Doane	Nuclear Safety Manager
J. Deist	Emergency Preparedness Coordinator
P. Giever	Structural Lead Engineer (Contractor)
D. Harris	Principal Engineer
J. Kreitzburg	Criticality Safety Engineer
R. Land	Site Manager
C. Manning	Nuclear Criticality Safety Manager
S. Powers	Manager, Project and Reliability Engineering
T. Tate	Environmental, Health, Safety and Licensing Manager

Other licensee employees contacted included engineers, technicians, production staff, and office personnel.

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Closed		
70-1257/2012-006-01	URI	Further evaluate whether the licensee is in compliance with the requirements of 70.62(c) and 70.61 performance requirements regarding natural phenomena events accident sequences
Opened		
70-1257/2016-006-01	VIO	Failure to Implement Management Measures for Fuel Storage Rack Concrete Anchors

3. INSPECTION PROCEDURE USED

TI 2600/16, Inspection of Activities Associated with NRC Generic Letter 2015-01
IP 88015, Nuclear Criticality Safety
IP 88020, Operational Safety
IP 88050, Emergency Preparedness
IP 88055, Fire Protection
IP 88070, Permanent Plant Modifications

4. DOCUMENTS REVIEWED

Records:

E04-06-005, Version 5.2, “Review of NCS Implementing Documents”

Change Control Forms (CCF):

ECN 8302C, dated 2/6/13
ECN 8505C, dated 3/5/10
ECN 8768, dated 2/3/16

Procedures:

C960P001, “Duct Inspection 3 Month OPCR”
E08-03-2.1, “EHS&L Document Emergency Preparedness – Part III Protective Action Decisions, Version 3.4
E04-2.9, ““EHS&L Document Emergency Preparedness – Part IV – MOUs Benton County Emergency Services, Version 5.0
E08-05-3.3, “EHS&L Document Emergency Preparedness – Pre Emergency Plan Hydrogen Plant, Version 2.0
E08-05-3.4, “EHS&L Document Emergency Preparedness – Hydrogen Gas Storage Area, Version 7.0
E08-03-6.6, “EHS&L Document Emergency Preparedness – Part III Implementing Pro Response to Severe Earthquake, Version 4.2
E08-03-6.7, “EHS&L Document Emergency Preparedness – Part III Response to Tornado/High Winds, Version 2.3
E08-03-6.8, “EHS&L Document Emergency Preparedness – Part III Response to Volcano Eruption, Version 5.0
E08-03-6.9, “EHS&L Document Emergency Preparedness – Part III Response to Severe Floods, Version 2.3
E08-03-8.2, “EHS&L Document Emergency Preparedness – Part III Plant Evacuation Procedures – Offsite, Version 4.0
E08-03-8.3, “EHS&L Document Emergency Preparedness – Part III Plant Evacuation Procedures – Onsite, Version 3.3
E08-03-11, “EHS&L Document Emergency Preparedness – Part III Classifying an Emergency,” Version 5.1
E10-08-011, “EHS&L Document Licensing – NRC Materials License SNM-1227 – Chapter 11 Management Measures, Version 1.0
MCP-30424, “Management Control Procedure, Operations Projects – Engineering Work Practice Guides Richland Fuel Fabrication Plant Utility Loss Procedure, Version 6.1
MCP-30379A, Version 4.1, “Construction or Modification Change Control”
MCP-30398, Version 1.0, “Mechanical Standard for Piping”
SOP-40920, Version 6.0, “IROFS and Equipment Essential to Safety”

Condition Reports Review:

2012-9934, Beyond Design Basis Natural Phenomenon Events (Seismic Stress Test) NRC and Areva Corporate Independently Expressed Concerns on this Topic following the Great Japanese Earthquake, 12/18/2012
2012-1061, NRC URI: UBC Seismic Event Design Criteria may not be sufficient to meet 10 CFR 70.61 Performance Criteria, 02/09/12

Condition Reports Written as a Result of this Inspection:

2016-5774, NRC Inspection 2016-006 associated with Natural Phenomenon (NPH) Observations, 09/01/2016

Other Documents:

6986 – ELO – S1, ELO Building Seismic Evaluation, 1974
6986 – ELO – S1, ELO Building Addition Seismic Evaluation, 1982
BLEU Conversion Complex Building, Job No. 4018.0, Structural Calculations, October 21, 2003
BLEU Bundle Storage Addition, Job No. 4018.5, Structural Calculations, March 26, 2007
CSA-612, 337 (Drawing)
CSA-611, 821 (P&ID)
Letter from Kenneth L. Kraft from Butler Manufacturing Company dated April 22, 1992, UO_2 Powder Storage Building
Lien, D., Design Analysis; Job No. V4 3956; UO_2 Building 1970; January 20, 1970
UO_2 Building Rod to Bundle Building Addition, Project No. 06-5133, Structural Calculations, March 26, 2007.
Drawing 3959-H-45, Foundation Plan, 1993 UO_2 South End Expansion, Rev. 2
Drawing 3959-H-48, Roof Framing, 1993 UO_2 South End Expansion, Rev. 3
Drawing 3959-H-47, Second Floor Plans, 1993 UO_2 South End Expansion, Rev. 1
Drawing 3959-H-49, Sections, 1993 UO_2 South End Expansion, Rev. 0
Drawing 3959-H-51, Sections, 1993 UO_2 South End Expansion, Rev. 0
Drawing 3959-H-63, Relocated Final Test Area Details, 1993 UO_2 South End Expansion, Rev. 1
Drawing EM-616,148, Structural Notes and Legend, UO_2 Building Rod to Bundle Addition, Sheet 1 of 8, Rev. 0
Drawing EM-616,148, Structural Foundation Plan, UO_2 Building Rod to Bundle Addition, Sheet 2 of 8, Rev. 0
Drawing EM-616,148, Structural Roof Framing Plan, UO_2 Building Rod to Bundle Addition, Sheet 3 of 8, Rev. 0
Drawing EM-616,148, Structural Sections & Details, UO_2 Building Rod to Bundle Addition, Sheet 5 of 8, Rev. 0
Drawing EM-616,148, Structural Sections & Details, UO_2 Building Rod to Bundle Addition, Sheet 6 of 8, Rev. 0
Drawing EM-616,148, Structural Sections & Details, UO_2 Building Rod to Bundle Addition, Sheet 7 of 8, Rev. 0
Drawing EM-616,148, Structural Plan, Elevations & Details, UO_2 Building Rod to Bundle Addition, Sheet 8 of 8, Rev. 0
Drawing 3959-H-064, UO_2 Building UF_6 Expansion Year 1976
Drawing 3659-A-82, UO_2 Powder Storage Building
Drawing 608-151S, Foundation Plan & Details, UO_2 Building Expansion Lab Addition Year 1993
Drawing EMF-616,106, Architectural Floor Plan, UO_2 Building Expansion BLEU Bundle Storage Addition, Sheet 1 of 3, Rev. 0
Drawing EMF-616,106, Building Elevations & Sections, UO_2 Building Expansion BLEU Bundle Storage Addition, Sheet 2 of 3, Rev. 0
Drawing EMF-616,106, Sections & Details, UO_2 Building Expansion BLEU Bundle Storage Addition, Sheet 1 of 3, Rev. 0
Drawing EMF-616, 459, “Wet Sprinkler System, Riser Details, Hanger & Equipment Details” Rev 1
Drawing EMF-616, 479, “Dry Sprinkler System Piping Plan & Details Warehouse 1, 2, 3 and Covered Areas” Rev 1
Drawing EMF-617,020, UO_2 Building Expansion BLEU Conversion Complex Addition, Sheet 1 of 1, Rev. 0

Dry Conversion Building – Central PRE-MIX Prestress Co., Dry Conversion Facility Structural Analysis, 1995
Meier Project No. 2392.1, Warehouse 7 Rack Seismic Analysis
MEAD Project #364-015, UO2 Bundle Storage Rack Seismic Analysis
Meier UO2 Building Bundle Storage – Fuel Assembly Storage Rack Frame Seismic Evaluation
Powder Storage Racks – Seismic Analysis Evaluation, August 12, 1992
Powder Drum Storage Racks Year 2000 – Seismic Analysis, January 21, 2000
Richland AREVA NP Site Seismic DOCs UO_2 South Addition, Seismic Structural Calculations, Calculation Number: 6986--UO_2 South Addition--S1, December 27, 2012
UO2 Addition – Analytic Lab
UO_2 Analytical Laboratory Addition Seismic Analysis, Calculation No. 6986, Rev. A, December 14, 2012
UO2 Bleu Addition Expansion Conversion Complex Addition Oxide Pellet Building
UO2 South Addition
UO2 UF6 Addition
Seismic Structural Calculations, Calculation No. 6986, UF_6 Expansion 1976- S1, December 28, 2012
Specifications for Process Buildings, Fuels Manufacturing Pilot Plant, Richland, Washington, Vitro/Hanford Engineering Services, April 8, 1970
Work Order 13030286
XN- 334 Design Criteria – UF_6 Conversion Expansion, June 16, 1976
XN-127 Design Criteria—Uranium Oxide Fuel Fabrication Plant Expansion, June 1973

NCSAs:

E04-NCSA-180, Version 17.0, “ELO Gad Scrap Uranium Recovery”
E04-NCSA-350, Version 15.0, “Powder Drum Warehouse (I3A)
EO4-NCSA-540, Version 13.0, “Bundle Assembly and Storage”
E04-830, Version 18.0, “Dry Conversion Powder Preparation”
E04-960, Version 27.0, “HVAC Exhaust Systems

NRC/Westinghouse Generic Letter Communications:

NRC Generic Letter 2015-01, Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities, dated June 22, 2015, ADAMS ML14328A029
LTR-RAC-15-43, Subject: Westinghouse Response to NRC Generic Letter 2015-01 Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities (Docket 70-1151), dated August 26, 2015, ADAMS ML15238B643
NRC Request for Supplemental Information, 02/22/16, ADAMS ML16005A112
LTR-RAC-16-22, Subject: Westinghouse Response to NRC Request for Additional Information (Cost Accounting Code Number L33337), dated June 21, 2016, ADAMS ML16173A375
Staff Evaluation of Westinghouse Columbia Fuel Fabrication Facility Response to Generic Letter 2015-01, “Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities (Cost Accounting Code Number: L33337), dated July 7, 2016, ADAMS ML16182A314 & ML16180A423
LTR-RAC-16-39, Subject: Westinghouse Natural Phenomena Hazard (NPH) Generic Letter 2015-01 Follow-up, dated July 6, 2016