

August 25, 2011

Mr. Dominique Grandemange, Site Manager
AREVA NP, Inc.
2101 Horn Rapids Road
Richland, WA 99352-5102

SUBJECT: INSPECTION REPORT NO. 70-1257/2011-203

Dear Mr. Grandemange:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine announced criticality safety inspection at your Richland, Washington facility from July 25-28, 2011. The purpose of the inspection was to determine whether activities involving licensed materials were conducted safely and in accordance with NRC requirements. An exit meeting was held on July 28, 2011, during which inspection observations and findings were discussed with your staff.

The inspection, which is described in the enclosure, focused on the most hazardous activities and plant conditions; the most important controls relied on for safety and their analytical basis; and the principal management measures for ensuring controls are available and reliable to perform their functions relied on for safety. The inspection consisted of analytical basis review, selective review of related procedures and records, examinations of relevant nuclear criticality safety (NCS)-related equipment, interviews with NCS engineers and plant personnel, and facility walkdowns to observe plant conditions and activities related to safety basis assumptions and related NCS controls. Throughout this inspection, observations were discussed with your managers and staff.

In accordance with 10 CFR 2.390 of NRC's "Rules of Practice," a copy of this letter and the enclosure will be available in the public electronic reading room of the NRC's Agency-Wide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC web site at <http://www.nrc.gov/reading-rm/adams.html>.

If you have any questions concerning this report, please contact Tamara D. Powell, of my staff, at (301) 492-3211.

Sincerely,

/RA/

Margaret Kotzalas, Acting Chief
Technical Support Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

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

Enclosure: Inspection Report 70-1257/2011-203

cc w/enclosures: Loren. J. Maas, AREVA NP
Calvin. D. Manning, AREVA NP
Robert. E. Link, AREVA NP

cc w/o enclosures: Mr. Gary L. Robertson, Director
Division of Radiation Protection
Department of Health, Bldg. 5
P.O. Box 47827
7171 Cleanwater Lane
Olympia, WA 98504-7827

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**U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS**

Docket No.: 70-1257

License No.: SNM-1227

Report No.: 70-1257/2011-203

Licensee: AREVA NP, Inc.

Location: Richland, WA

Inspection Dates: July 25-28, 2011

Inspectors: Tamara D. Powell, Criticality Safety Inspector
April Smith, Risk Analyst

Approved by: Margaret Kotzalas, Acting Chief
Technical Support Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Enclosure

EXECUTIVE SUMMARY

**AREVA Nuclear Power, Inc.
U.S. Nuclear Regulatory Commission
Inspection Report No. 70-1257/2011-201**

Introduction

Staff of the U.S. Nuclear Regulatory Commission (NRC) performed a routine and announced nuclear criticality safety (NCS) inspection of the AREVA Inc. (AREVA NP) facility in Richland, Washington from July 25-28, 2011. The inspection included an on-site review of the licensee's NCS program; NCS analyses; plant operations; NCS inspections, audits and investigations; criticality accident alarm system; and NCS-related events. The inspection also reviewed activities in the uranium hexafluoride (UF₆) cylinder receiving pad, the Dry Conversion Facility (DCF), the Uranium Dioxide (UO₂) Building including scrap recovery processes, the blended low-enriched uranium (BLEU) facility, rod and bundle fabrication shops, the incinerator, Engineering Laboratory Operations (ELO), the BLEU powder storage area, the ammonium diuranate (ADU) process area, rod and bundle assembly areas, the UF₆ cylinder wash process, the miscellaneous uranium recovery (MUR) tank gallery, the pellet dissolver area and the uranium oxide (U₃O₈) ovens.

Results

- No safety concerns were identified regarding the licensee's NCS program.
- No safety concerns were identified regarding the licensee's internal NCS audits.
- No safety concerns were identified regarding the licensee's identification and investigation of internal events.
- No safety concerns were identified regarding the licensee's criticality alarm system.
- No safety concerns were identified during walkdowns of plant operations.

REPORT DETAILS

1.0 Plant Status

The licensee manufactures light water reactor fuel at its Richland, Washington facility. During the inspection, the licensee was conducting routine dry conversion, powder preparation, pelletizing and bundle fabrication operations.

2.0 Nuclear Criticality Safety Program (IP 88015 & 88016)

a. Inspection Scope

The inspectors reviewed the licensee's NCS program and analyses. The inspectors evaluated the adequacy of the program and analyses to assure the safety of fissile material operations. The inspectors reviewed selected aspects of the following documents:

- E04-05-01, "Nuclear Criticality Standards," Version 10.0, dated July 1, 2010
- E04-06-004, "Preparation and Review of Nuclear Criticality Safety Documents," Version 8, dated October 21, 2010
- E04-06-005, "Review of Nuclear Criticality Safety Implementing Documents," Version 4, dated February 2, 2010
- E04-06-006, "Nuclear Criticality Safety Management System Assessment," Version 5.0, dated March 4, 2011
- E04-NCSA [Nuclear Criticality Safety Analysis]-000, "UF6 Cylinder Receiving and Storage," Version 6.0, dated September 22, 2010
- E04-NCSA-163, "Industrial Waste Water Treatment Facilities," Version 18, dated March 21, 2011
- E04-NCSA-186, "Supercritical Carbon Dioxide (CO₂) Extraction System," Version 4, dated April 22, 2011
- E04-NCSA-210, "ELO Drain System," Version 6.0, dated March 8, 2011
- E04-NCSA-350, "Powder Drum Warehouse," Version 6, dated March 31, 2011
- E04-NCSA-395, "BLEU Pellet Grinding," Version 9.0, dated July 16, 2010
- E04-NCSA-540, "Bundle Assembly and Storage," Version 5.0, dated May 13, 2011
- E04-NCSA-810, "Dry Conversion Vaporization System," Version 9.0, dated October 28, 2010
- E04-NCSS [Nuclear Criticality Safety Specification]-G01, "NCS Guide Rules and Generic Program Requirements," Version 4.0, dated June 16, 2006
- E15-01-1, "Integrated Safety Analysis (ISA) Summaries, Part 1 – Chapters 1-8 Richland Facility ISA Program," Version 12.0, dated January 13, 2011
- E15-01-2.12, "ISA Summaries, Part 2 – Chapter 12 – ELO Building," Version 8.0, dated January 21, 2011
- E15-03-002, "ISA Procedures, Integrated Safety Analysis Program Standard," Version 7.0, dated January 4, 2011
- E15-03-005, "Procedures and Practices for Performing Hazards Analyses," Version 4.0, dated January 27, 2011
- SOP [Standard Operating Procedure]-40369, "GSUR Solvent Extraction Process," Version 17.0, dated April 22, 2010
- SOP-40370, "GSUR Solvent Extraction Raffinate Treatment," Version 15.0, dated April 22, 2010

- SOP-40486, "Richland Operations General Rules," Version 22.0, dated June 21, 2010

b. Observations and Findings

The inspectors reviewed new and revised analyses and specifications (NCSAs and nuclear criticality safety specifications (NCSSs)). The inspectors interviewed the licensee's managers and engineers in the safety and production departments, operations engineers, and selected operators. The inspectors reviewed selected NCS-related items relied on for safety (IROFS) to determine that performance requirements have been met for selected accident sequences. During walkdowns, the inspectors evaluated the adequacy of IROFS to assure subcritical margin for normal and credible abnormal conditions.

c. Conclusions

No safety concerns were identified regarding the licensee's NCS program.

3.0 Nuclear Criticality Safety Inspections, Audits, and Investigations (IP 88015)

a. Inspection Scope

The inspectors reviewed the licensee's internal audit procedure, records of previously completed audits of fissile material operations, walkthrough schedules and logs, and records of NCS infractions. The inspectors reviewed selected aspects of the following documents:

- E04-04-007, "2009 AREVA NP Inc. Richland Nuclear Criticality Safety Program Assessment," Version 1.0, dated September 30, 2009
- E04-06-002, "Routine Nuclear Criticality Safety Audits," Version 3.0, dated May 28, 2010
- E04-06-007, "Routine Nuclear Criticality Safety Walkthroughs," Version 2.0, dated February 25, 2011
- E04-07-201012, "NCS Audit/Inspection Report – December 2010," Revision 1, dated January 24, 2011
- E04-07-201101, "NCS Audit/Inspection Report – January 2011," Revision 1, dated February 15, 2011
- E04-07-201102, "NCS Audit/Inspection Report – February 2011," Revision 1, dated March 22, 2011
- E04-07-201103, "NCS Audit/Inspection Report – March 2011," Revision 1, dated May 2, 2011
- E04-07-201104, "NCS Audit/Inspection Report – April 2011," Revision 1, dated May 24, 2011

b. Observations and Findings

The inspectors discussed the audit and inspection process with facility NCS personnel, reviewed audit procedure E04-06-002, and accompanied a licensee NCS engineer on an audit of the BLEU processes including pellet pressing, sintering furnaces, pellet grinding, and pellet storage. The inspectors observed that the licensee audit was

performed in accordance with written procedures.

c. Conclusions

No safety concerns were identified regarding the licensee's internal NCS audits.

4.0 Nuclear Criticality Safety Event Review and Follow-up (IP 88015)

a. Inspection Scope

The inspectors reviewed the licensee's response to internally-reported events. The inspectors reviewed the progress of investigations and interviewed licensee staff regarding immediate and long-term corrective actions. The inspectors reviewed selected aspects of the following documents:

- 2009-7965-FA, "Self-Assessment Planning", dated September 30,
- 2011-855-FA, EHS&L Condition, "NCS Infraction 2011-006, IROFS 1604 Degraded, a 45 Gallon UO₂ Powder Drum at Press 6 Feed Hopper Did Not Receive the Required Drum Number vs Material Check," dated February 7, 2011
- 2011-2412-FA EHS&L Condition, "NCS Infraction 2011-012 IROFS 2106 Degraded, SBC [safe batch container] with Moderated Contents Stored in a Dry Safe Batch Storage Area," dated March 31, 2011
- 2011-2683-FA EHS&L Condition, "NCS Infraction 2011-013, IROFS 4502 Degraded/IROFS 3005 Failed Combustible Loading Discovered in UO₂ Building Room I3A," dated April 11, 2011
- 2011-3625-FA, EHS&L Condition, "NCS Infraction 2011-015 Management Measure Failed, CPMs C960P004 and C370P002, and CIRM C163I104 were Inadvertently Deactivated from SAP and were not Performed as Required," dated May 13, 2011
- 2011-3687-FA, EHS&L Condition, "NCS Infraction, 2011-016, IROFS 1604 Degraded, a 45 Gallon UO₂ Powder Drum at Press 3 Feed Hopper Did Not Receive the Required Drum Number vs Material Check," dated May 20, 2011
- 2011-4439 EHS&L Condition, "NCS Infraction 2011-019, IROFS Degraded SBC Over batched in Centrifuge Download Hood in Room 100 Ceramic Area," dated June 20, 2011
- 2011-5167-FA, EHS&L Condition, "NCS Infraction, 2011-029, IROFS 314 Degraded, [Double Batch of Raffinate from Tanks TK-317/318 was Processed through a Single Filter Press and Transferred to a Drum]," dated July 25, 2011
- E04-NCSA-185, "Raffinate Treatment Process," Version 11.0, dated March 17, 2011
- E04-NCSS-185, Raffinate Treatment Process, Version 10.0, dated September 14, 2010
- E18-01-002, "Safety, Environmental or MC&Z Incident Notifications," Version 11, dated July 1, 2010

b. Observations and Findings

The inspectors reviewed selected licensee internally-reported events. The inspectors reviewed condition report, 2011-5167-FA, which reports IROFS 314 as degraded because, on July 18, 2011, operators processed two ELO raffinate batches through a

single filter press. IROFS 314 is one of two IROFS the licensee credits as mass/concentration control in defense against a potential criticality whereby more than 35kg of uranium is placed into a single drum. Specifically, IROFS 314 states that gamma analysis of the filter cake prior to its transfer to the drum defends against the accumulation of highly concentrated uranium in a single drum. The inspectors reviewed sampling manifests and interviewed the operator and engineering personnel associated with the condition report (CR) to verify that neither the mass nor concentration of uranium exceeded the analyzed limits of 35kg and 90 U/l, respectively. The inspectors determined that the performance requirements were met. However, the inspectors noted that the ISA summary, the NCSA, and the NCS standard for the raffinate treatment process note Defense 309 that states, "design of the filter press and type of filter aid used shall be such that the filter press will plug before a double batch of raffinate could be processed." Given that the operators processed a double batch of raffinate through the same filter press, the licensee elevated this CR to determine the apparent cause and re-evaluate Defense 309. The inspectors had no immediate safety concerns regarding this event.

c. Conclusions

No safety concerns were identified regarding the licensee's identification and investigation of internal events.

5.0 Criticality Alarm Systems (IP 88017)

a. Inspection Scope

The inspectors reviewed documentation of criticality accident alarm detector coverage, interviewed engineering staff, and performed facility walkdowns to determine the adequacy of the licensee criticality alarm system. The inspectors reviewed selected aspects of the following documents:

- E04-09-001, "Criticality Accident Alarm System Coverage Demonstration," Version 1.0, dated August 9, 2010

b. Observations and Findings

The inspectors reviewed the description and placement of criticality alarms in document E04-09-001. The inspectors verified that the licensee's placement of the criticality accident alarm detectors has been established in accordance with the criteria described in 10 CFR 70.24. The inspectors observed the locations of selected criticality detectors during plant walkdowns.

c. Conclusions

No safety concerns were identified regarding the licensee's criticality alarm system.

6.0 Plant Activities (IP 88015)

a. Inspection Scope

The inspectors performed plant walkdowns to review activities in progress and to

determine whether risk-significant fissile material operations were being conducted safely and in accordance with regulatory requirements. The inspectors interviewed operators, NCS engineers, and process engineers both before and during walkdowns.

Observations and Findings

The inspectors performed walkdowns of the UF₆ cylinder receiving pad, the DFC, the UO₂ Building including scrap recovery processes, the BLEU facility, rod and bundle fabrication shops, the incinerator, ELO, including the raffinate treatment process, the BLEU powder storage area, the ADU process area, rod and bundle assembly areas, the uranium hexafluoride UF₆ cylinder wash process, the MUR tank gallery, the pellet dissolver area and the U₃O₈ ovens. The inspectors noted that observed operations were performed in accordance with written procedures.

b. Conclusions

No safety concerns were identified during walkdowns of plant operations.

7.0 Open Item Review

VIO 70-1257-201-01

This violation tracks the licensee's failure to implement IROFS for the ammonia recovery facility (ARF) stripper column. During the previous inspection, the inspectors reviewed the licensee event report and corrective actions for reportable event EN 46447 involving accumulation of a greater than expected amount of fissile material in a stripper column in the ARF which the licensee had reported to NRC on December 2, 2010. During this inspection, the inspectors verified the implementation of the 13 corrective actions that had been assigned. The inspectors determined that all of the corrective action associated with the event had been implemented with the exception of two items. The inspectors further determined that two IROFS on the stripper column, 1) periodic survey and 2) annual chemical cleaning, had been implemented. The inspectors noted that the two corrective actions that had not been completed related to efforts to reduce solids deposition by 1) improving the effectiveness of Tanks 713 A/B and 2) improving the controls on liquid effluent from the ADU line to reduce the U concentration being transmitted to tanks 713 A/B. The licensee indicated that these process improvements would be implemented in September 2011. This item is closed.

8.0 Exit Meeting

The inspectors communicated the inspection scope and results on July 28, 2011. The licensee's management acknowledged and understood the findings as presented.

SUPPLEMENTARY INFORMATION

1.0 List of Items Opened, Closed, and Discussed

Items Opened

None

Items Closed

VIO 70-1257/2011-201-01	Failure to implement IROFS for the ammonia recovery facility stripper column.
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Items Discussed

None

2.0 Inspection Procedures Used

IP 88015	Nuclear Criticality Safety (NCS) Program
IP 88016	NCS Evaluations and Analyses
IP 88017	Criticality Alarm Systems

3.0 Key Points of Contact

AREVA NP, Inc. - Richland

D. Grandemange	Site Manager
C. Manning	Manager, NCS
W. Doane	NCS Team Leader
L. Maas	Manager, Regulatory Compliance
R. Link	Manager, Environmental, Health, Safety, and Licensing
K. Kulesza	NCS Engineer

NRC

T. Powell	Criticality Safety Inspector
A. Smith	Risk Analyst

All attended the exit meeting on July 28, 2011.

Attachment

4.0 List of Acronyms and Abbreviations

ADAMS	Agency-Wide Document Access and Management System
ADU	ammonium diuranate
AREVA NP	AREVA Nuclear Power, Inc.
ARF	Ammonia Recovery Facility
BLEU	blended low-enriched uranium
CEI	Controlled Event Index
CR	Condition Report
DCF	Dry Conversion Facility
ELO	Engineering Laboratory Operations
IFI	Inspectors Follow-up Item
IP	inspection procedure
IROFS	item relied on for safety
NCS	nuclear criticality safety
NCSA	nuclear criticality safety analysis
NCSS	nuclear criticality safety specification
NRC	Nuclear Regulatory Commission
MURS	miscellaneous uranium recovery
PFOD	probability of failure on demand
PHA	Process Hazard Analysis
SNM	special nuclear material
U ₃ O ₈	uranium oxide
UF ₆	uranium hexafluoride
UO ₂	uranium dioxide
VIO	Violation