January 5, 2007

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

SUBJECT: INSPECTION REPORT NO. 70-1257/2006-204

Dear Mr. Land:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine announced criticality safety inspection at your Richland, Washington, facility from December 4 through December 7, 2006. 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 December 7, 2006, during which inspection observations and findings were discussed with your staff.

The inspection, which is described in the enclosure, focused on: (1) changed or new nuclear criticality safety analyses; (2) criticality accident alarm coverage; (3) nuclear criticality safety (NCS) inspections, audits and investigations; (4) NCS training; and (5) observation of ongoing plant operations. The inspection consisted of analytical basis review, selective review of related procedures and records, examinations of relevant nuclear criticality safety-related equipment, interviews with nuclear criticality safety engineers and plant personnel, and facility walkdowns to observe plant conditions and activities related to safety basis assumptions and related nuclear criticality safety controls. No violations of NRC requirements were identified during this inspection.

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 Dennis Morey, of my staff, at (301) 415-6107.

Sincerely,

/RA/

Melanie A. Galloway, Chief
Technical Support Branch
Division of Fuel Cycle Safety
and Safeguards

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

Enclosure: Inspection Report 70-1257/2006-204

cc w/enclosures: L. J. Maas, AREVA NP
C. D. Manning, AREVA NP
R. E. Link, AREVA NP

cc w/o enclosures: Mr. Gary Robertson, Washington Department of Health

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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.:	70-1257/2006-204
Licensee:	AREVA NP, Inc.
Location:	Richland, WA
Inspection Dates:	December 4 - 7, 2006
Inspectors:	Dennis C. Morey, Senior Criticality Safety Inspector, NRC Headquarters Blake A. Purnell, Criticality Safety Reviewer, NRC Headquarters Roxanne G. Wray, Program Assistant, NRC Headquarters
Approved by:	Melanie A. Galloway, Chief Technical Support Branch Division of Fuel Cycle Safety and Safeguards

Enclosure

AREVA NP, Inc.
NRC Inspection Report No. 70-1257/2006-204

EXECUTIVE SUMMARY

Introduction

Staff of the U.S. Nuclear Regulatory Commission (NRC) performed a routine and announced nuclear criticality safety (NCS) inspection of the AREVA NP facility in Richland, Washington from December 4 through December 7, 2006. The inspection included an on-site review of the licensee NCS program; NCS analyses; plant operations; criticality accident alarm coverage; NCS inspections, audits and investigations; NCS training; and open item followup. The inspection focused on risk-significant fissile material processing activities in the Uranium Dioxide (UO_2) Building including scrap recovery processes, the blended low-enriched uranium (BLEU) facility, rod and bundle fabrication shops, the dry conversion facility (DCF), Engineering Laboratory Operations (ELO) and the neutron absorbing fuels (NAF) facility.

Results

- No safety concerns were identified during review of the licensee NCS program.
- No concerns were identified during the review of the licensee NCS training program.
- Licensee NCS audits and review of NCS infractions were adequate for maintaining acceptable levels of safety.
- Plant operations involving fissile materials were conducted safely and in accordance with written procedures.
- No new or changed criticality accident sequences were identified during review of a reportable event in the DCF.
- Licensee NCS analyses met regulatory requirements and license commitments.
- Licensee criticality accident alarm detectors provided adequate coverage of fissile operations to reliably detect the minimum accident of concern.

REPORT DETAILS

1.0 Plant Status

The licensee was restarting the DCF after repairing a leaking reactor vessel which had resulted in an exposure event. The Ammonium Diuranate (ADU) process had been recently restarted following a shutdown to allow for installation of a new ADU dryer. Routine operations were being conducted in ceramics, the BLEU facility, the NAF facility, and the ELO facility.

2.0 Nuclear Criticality Safety Program (88015)

a. Inspection Scope

The inspectors reviewed the licensee NCS program. The inspectors evaluated the adequacy of the program to assure the safety of fissile material operations. The inspectors interviewed licensee managers and engineers in the safety and production departments, the training manager, 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 effectiveness of IROFS to assure adequate subcritical margin for normal and credible abnormal conditions.

b. Observations and Findings

The inspectors observed that the licensee had an NCS program which was independent from production and was implemented through written procedures. The inspectors also observed that the licensee NCS program reviewed process changes affecting criticality safety.

The inspectors reviewed selected criticality safety analyses (CSAs) and determined that appropriate criticality safety accident sequences were identified and controlled consistent with the associated criticality safety evaluation. The inspectors reviewed selected IROFS supporting NCS controls on the ADU dryer and in BLEU scrap recovery. The inspectors determined that IROFS corresponded to the approved analytical results and designated controls and were adequate to meet performance requirements for the selected accident sequences.

c. Conclusions

No safety concerns were identified during review of the licensee NCS program.

3.0 Nuclear Criticality Safety Training (88015)

a. Inspection Scope

The inspectors reviewed the content of NCS training for general workers and for fissile material handlers. The inspectors evaluated the effectiveness of the licensee NCS training through interviews with both categories of workers. The inspectors also interviewed licensee training management. The inspectors reviewed selected aspects of the following document:

- MCP-30130, "Management Control Procedure Training - General Instructions, Plant Operations Training Program," Version 5.0

b. Observations and Findings

The inspectors determined that each employee had taken general NCS training. In addition, an online refresher course must be completed every 365 days with a needed passing grade of 80%. There is also an online course for managers and engineers.

Online courses are administered through the PLATEAU learning management system that has been in use since June 2005. Through the PLATEAU system, the licensee has the ability to track the training status of operators and prevent the performance of tasks if an operator is not qualified. Supervisors check at least three times a week to verify that an operator's training is up-to-date. In addition to supervisors, operators routinely access the PLATEAU system to ensure that their training is not overdue. The inspectors determined that the PLATEAU system assures that employees complete appropriate training before performing risk-significant tasks.

c. Conclusions

No concerns were identified during the review of the licensee NCS training program.

4.0 Nuclear Criticality Safety Inspections, Audits, and Investigations (88015)

a. Inspection Scope

The inspectors reviewed licensee internal audit procedures, records of previously completed audits of fissile material operations, and records of NCS infractions. The inspectors observed a member of the licensee's NCS staff while they conducted an audit in the ADU processing area. The inspectors reviewed selected aspects of the following documents:

- E04-06-002, "Routine Nuclear Criticality Safety Audits," Version 1.0, dated September 15, 2005
- E04-07-200607, "Nuclear Criticality Safety Audit/Inspection Report-July 2006," Version 1.0, dated August 21, 2006
- E04-07-200608, "Nuclear Criticality Safety Audit/Inspection Report-August 2006," Version 1.0, dated September 19, 2006

- E04-07-200609, "Nuclear Criticality Safety Audit/Inspection Report-September 2006," Version 1.0, dated October 16, 2006
- E04-07-200610, "Nuclear Criticality Safety Audit/Inspection Report-October 2006," Version 1.0, dated November 28, 2006
- Reports of NCS Infractions, January–November, 2006

b. Observations and Findings

The inspectors found that NCS audits were conducted according to procedural requirements. The inspectors noted that NCS audits were focused on determining that plant operations requirements conform to those listed in the applicable NCS specification documents. During the audit of the ADU process area, the inspector observed that the licensee's NCS auditor examined NCS postings, labels, IROFS, and other controls. The inspectors also noted that the licensee's NCS auditor observed operations personnel perform selected tasks and questioned operations personnel about NCS limits and controls.

The inspectors observed that the documentation of NCS infractions included a description of the event, corrective actions taken, current status, an evaluation of whether any IROFS had degraded or failed, and an evaluation of reportability to the NRC. The inspectors also observed that the licensee analyzes the NCS infractions for trends, and that there have been fewer infractions this year as compared to last year.

c. Conclusions

Licensee NCS audits and review of NCS infractions were adequate for maintaining acceptable levels of safety.

5.0 Plant Activities (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.

b. Observations and Findings

The inspectors performed walkdowns of the UO_2 Building, including scrap recovery processes and rod and bundle fabrication, the BLEU facility, the DCF, the ELO facility and the NAF facility. No safety concerns were noted during walkdowns.

c. Conclusions

Plant operations involving fissile materials were conducted safely and in accordance with written procedures.

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

a. Inspection Scope

The inspectors reviewed a recent incident in the DCF to determine how NCS controls were involved or affected and whether any criticality accident sequences had been changed, revealed or created. The inspectors interviewed engineers and operators and performed a walkdown of the facility and equipment.

b. Observations and Findings

On October 26, 2006, the licensee reported an event involving a leak of gaseous hydrofluoric acid (HF) from a reactor vessel into the DCF during which an operator was exposed. This chemical safety event is discussed in inspection report 70-1257/2006-010. During the current inspection, the inspectors reviewed the facility and equipment associated with the event including the vessel head inspection ports where the leak occurred to determine any potential impact on criticality accident sequences. The inspectors determined that, although equipment integrity was a common NCS control, the type of manufacturing fault that caused the HF leak would not be expected to change or create any new criticality accident sequences in DCF.

c. Conclusions

No new or changed criticality accident sequences were identified during review of a reportable event in DCF.

7.0 Nuclear Criticality Safety Evaluations and Analyses (88016)

a. Inspection Scope

The inspectors reviewed NCS analyses to determine that criticality safety of risk-significant operations was ensured through engineered and administrative controls with adequate safety margin including preparation and review by qualified staff. The inspectors accompanied NCS and other technical staff on walkdowns of NCS controls in selected plant areas. The inspectors reviewed selected aspects of the following documents:

- CSA E04-NCSA-70, “ADU-Line, ADU-Process,” Revision 5.0, dated October 6, 2006
- CSA E04-NCSA-185, “Raffinate Treatment Process,” Revision 3.0, dated August 15, 2006
- CSA E04-NCSA-090, “Line 2 UO2 Powder Production,” Revision 5.0, dated May 15, 2006
- CSA E04-NCSA-135, “BLEU Scrap Recovery,” Revision 3.0, dated May 17, 2006
- Criticality Safety Specification (CSS) E04-NCSS-070, “ADU-Line, ADU-Process,” Revision 5.0, dated October 6, 2006
- Calibration Instruction C100P001, “Overflow/Vents,” Revision 19, dated October 6, 2006

- Calibration Instruction C070P002, “ADU Alarm and Interlock Checks,” Revision 7, dated October 6, 2006
- E04-NCSA-205, “Mop Powder Dissolver Facility,” Version 3.0, dated August 16, 2006
- E04-NCSA-G4.1, “Equivalent Moisture Content of Additives,” Version 1.0, dated October 4, 2006
- E04-NCSA-210, “ELO Drain System,” Version 3.0, dated August 16, 2006
- E04-NCSA-135, “BLEU Scrap Recovery,” Version 3.0, dated May 17, 2006

b. Observations and Findings

The inspectors determined that NCS analyses were performed by qualified NCS engineers, that independent reviews were completed for the evaluations by other qualified NCS engineers, that subcriticality of the systems and operations was assured through appropriate limits on controlled parameters, and that double contingency was assured for each credible accident sequence leading to inadvertent criticality.

The inspectors determined that for the NCS analysis reviewed, assumptions were appropriate, criticality safety accident sequences were appropriately identified, and NCS controls for equipment and processes met performance requirements and assured the safety of the operations.

c. Conclusions

Licensee NCS analyses met regulatory requirements and license commitments.

8.0 Criticality Alarm System (88017)

a. Inspection Scope

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

- “Users Manual for the Criticality Alarm Detection and Alarm System,” Revision 1, dated August 1992
- “Siemens Criticality Alarm Demonstration,” dated October 30, 1992
- “Criticality Accident Alarm System Coverage Analysis for FANP-Richland,” Revision 0, dated June 9, 2004
- Preventive Maintenance Instruction PM003887, “Criticality Howlers,” Revision 7, dated March 7, 2005

b. Observations and Findings

The inspectors determined that the licensee had installed and maintained a system of criticality detectors that was capable of monitoring fissile material operations at the facility. The system consisted of boron-trifluoride neutron detectors in sets of three

detectors per location at nine locations. Point depletion analysis established that these detectors were capable of detecting the minimum accident of concern in all fissile material areas and generating an adequate evacuation signal. In two areas, the outside waste drum storage area (1992) and the BLEU drum storage area (2004), the licensee had performed monte carlo n-particle (MCNP) calculations using similar fission sources. The inspectors noted that the result of the 2004 BLEU drum storage MCNP calculation was similar to the result of the 1992 waste drum storage calculation even though BLEU drum storage involved more significant shielding and absorption. The inspectors also noted that the units of the solution (total particles) was different from the units of the detector trip point (fluence). The licensee provided additional information regarding the 2004 MCNP calculation indicating that the detector was closer to the source than in the 1992 calculation (190 versus 255 feet). The licensee also provided information that approximately 33,000 incident neutrons would be sufficient to reach the detector setpoint and that the 2004 calculation showed that approximately 1,200,000 neutrons would reach the detector.

The inspectors noted that variance reduction was employed in the 2004 BLEU drum storage MCNP calculation but not documented so that the statistical reliability of the solution could not be evaluated. The licensee provided the inspectors with a description of the variance reduction methodology and the results of the MCNP internal statistical tests. The inspectors determined that the licensee had used an appropriate analytical methodology and that the determination that the BLEU drum storage area was covered by an existing criticality detector was adequate.

c. Conclusions

Licensee criticality accident alarm detectors provided adequate coverage of fissile operations to reliably detect the minimum accident of concern.

9.0 Open Item Follow-up

IFI 70-1257/2004-203-03

This item tracks the licensee's evaluation of the impact of uranium-hydrocarbon benchmarks. During a previous inspection, the inspectors noted that the licensee's collection of benchmark experiments did not include uranium-hydrocarbon systems. The inspectors had determined through interviews with licensee NCS staff that uranium-hydrocarbon systems (e.g., pellet press oil) existed at the facility and were routinely modeled in NCS calculations. The licensee acknowledged the lack of applicable benchmarks in the validation report and agreed to further evaluate the impact of uranium-hydrocarbon systems on bias. The licensee performed a qualitative review establishing the suitability of the existing benchmark set and determined that there would be limited value to further analysis. During a subsequent inspection, the inspector determined that qualitative analysis was not adequate for demonstrating the impact of hydrocarbons on the licensee benchmark set. During the current inspection, the licensee observed that the calculations in question were parameter studies of hydrocarbon-moderated systems not used to establish plant safety limits. Inspectors will

review licensee use of parameter studies during a future inspection. This item remains open.

VIO 70-1257/2005-203-01

This item tracks the licensee's failure to designate appropriate IROFS for the accident sequence of inadvertently introducing dry hydrogenous additives into 55-gallon drums in the BLEU warehouse storage array. During a previous inspection, the inspectors determined that the licensee had committed to four corrective actions to prevent recurrence of the event. Three of the corrective actions were already completed including: (1) establishing a work practice dealing with accident scenario identification and evaluation; (2) establishing a work practice dealing with review of CSA and ISA documents; and (3) training ISA Team Leaders and ISA Team members to the new work practice documents. The fourth corrective action was development of refresher training for ISA Team Leaders that includes hazard evaluation techniques and lessons learned since the previous training. During the current inspection, the inspectors determined that the licensee has developed a formal refresher training course for ISA Team Leaders and ISA Team members and employees are expected to begin training by mid-January 2007 and will repeat the training every 2 years. The inspectors reviewed the training materials and determined that the licensee has adequately addressed the fourth corrective action. This item is closed.

10.0 Exit Meeting

The inspectors communicated the inspection scope and results to members of AREVA NP management throughout the inspection and during an exit meeting on December 7, 2006. Licensee 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 70-1257/2005-203-01	Tracks the licensee's failure to designate appropriate IROFS for the accident sequence of inadvertently introducing dry hydrogenous additives into 55-gallon drums in the BLEU warehouse storage array.

Items Discussed

IFI 70-1257/2004-203-03	Tracks the licensee's evaluation of the impact of uranium-hydrocarbon benchmarks.

2.0 Inspection Procedures Used

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

3.0 Key Points of Contact

AREVA NP, Inc. - Richland

*R. Land	Plant Manager
C. Manning	Manager, NCS
*J. Diest	NCS Team Leader
*W. Doane	NCS Engineer
*L. Maas	Manager, Regulatory Compliance
*R. Link	Manager, Environmental, Health, Safety, and Licensing
*C. Perkins	Manager, Facility Operations
T. Probasco	Manager, Emergency Operations
T. Johnson	Manager, Training

*D. Morey	Senior Criticality Safety Inspector, NRC Headquarters
*B. Purnell	Criticality Safety Reviewer, NRC Headquarters
*R. Wray	Program Assistant, NRC Headquarters

*Attended the exit meeting on December 7, 2006

4.0 List of Acronyms and Abbreviations

ADAMS	Agency-Wide Document Access and Management System
ADU	Ammonium Diuranate
AREVA NP	AREVA Nuclear Power, Inc. (current company name)
BLEU	blended low-enriched uranium
CFR	Code of Federal Regulation
CSA	criticality safety analysis
CSS	criticality safety specification
DCF	dry conversion facility
ECN	engineering change notice
ELO	Engineering Laboratory Operations
HF	hydrofluoric acid
IFI	inspector follow-up item
IP	inspection procedure
IROFS	item relied on for safety
ISA	integrated safety analysis
MCNP	monte-carlo n-particle
NAF	neutron absorbing fuels
NCS	nuclear criticality safety
UO_2	uranium dioxide
VIO	violation