

August 16, 2006

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

SUBJECT: INSPECTION REPORT NO. 70-1257/2006-202

Dear Mr. Land:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine announced criticality safety inspection at your Richland, Washington, facility from July 17 through July 20, 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 July 20, 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) configuration management; and (3) 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>.

R. Land

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If you have any questions concerning this report, please contact Harry Felsher, of my staff, at (301) 415-5521.

Sincerely,

**/RA/**

Dennis Morey, Acting Chief  
Technical Support Section  
Special Projects Branch  
Division of Fuel Cycle Safety  
and Safeguards

Docket No.: 70-1257

License No.: SNM-1227

Enclosure: Inspection Report 70-1257/2006-202

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

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

R. Land

-2-

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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.: 70-1257/2006-202

Licensee: AREVA NP, Inc.

Location: Richland, WA

Inspection Dates: July 17-20, 2006

Inspectors: Harry D. Felsher, Criticality Safety Inspector, NRC Headquarters  
Tamara D. Powell, Criticality Safety Reviewer, NRC Headquarters  
Christopher A. Speer, Student Engineer, NRC Headquarters

Approved by: Dennis Morey, Acting Chief  
Technical Support Section  
Special Projects Branch  
Division of Fuel Cycle Safety  
and Safeguards

**Enclosure**

**AREVA NP, Inc.**  
**NRC Inspection Report No. 70-1257/2006-202**

**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 July 17 through July 20, 2006. The inspection included an on-site review of the licensee NCS program, NCS analyses, plant operations, configuration management, 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<sub>2</sub>) Building including scrap recovery processes, the blended low-enriched uranium (BLEU) facility, the dry conversion facility, and the specialty fuels facility.

**Results**

- The NCS program was adequate for maintaining acceptable levels of safety.
- Plant operations involving fissile materials were conducted safely and in accordance with written procedures.
- Configuration management was adequate for incorporating NCS into the change process and was in accordance with written procedures.
- Licensee NCS audits were adequate for maintaining acceptable levels of safety.
- The inspectors did not identify any safety concerns related to licensee event followup.
- The licensee training management system assures that general plant workers and fissile material handlers complete required general NCS training.

## REPORT DETAILS

### 1.0 Plant Status

The Ammonium Diuranate (ADU) process has been shut down since May 2006, partially to allow for the replacement of the ADU dryer with a newer type. The Engineering Laboratory Operations (ELO) has been shut down since the May 2006 unanalyzed condition event. Routine operations were being conducted in ceramics, the BLEU facility, and the dry conversion facility.

### 2.0 Nuclear Criticality Safety Program (88015)

#### 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:

- E04-NCSA-830, "Dry Conversion Powder Preparation," Version 4.0, dated March 16, 2006
- E04-NCSA-135, "BLEU Scrap Recovery," Version 3.0, dated May 17, 2006
- E04-NCSA-390, "UO<sub>2</sub> Pellet Grinding and Inspection," Version 6.1, dated May 25, 2006
- E04-NCSA-640, "NAF Pellet Outgas Furnace," Version 2.1, dated January 18, 2006
- E04-NCSA-610, "Speciality Fuels Pellet Pressing and Loaded Pellet Box Transport," Version 4.0, dated January 21, 2006
- E04-NCSA-395, "NAF Rod Loading and Pellet Vault Storage in SF Building," Version 2.1, dated January 18, 2006
- E04-NCSA-480, "UO<sub>2</sub> Rod Transport and Storage," Version 4.0, dated March 29, 2006
- E04-NCSA-360, "Lube Blend Press Feed," Version 3.0, dated January 26, 2006
- E04-NCSA-790, "Development, Process Support and Analytical Labs," Version 3.0, dated January 24, 2006
- E04-NCSA-185, "Raffinate Treatment Process," Version 2.0, dated December 6, 2005

#### 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 NCS controls for equipment and processes assured the

safety of the operations.

c. Conclusions

The NCS program was adequate for maintaining acceptable levels of safety.

**3.0 Plant Operations (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<sub>2</sub> Building, including scrap recovery processes, the BLEU facility, the dry conversion facility, and the specialty fuels facility. No safety concerns were noted during walkdowns.

c. Conclusions

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

**4.0 Configuration Management (88015)**

a. Inspection Scope

The inspectors interviewed NCS engineers and process engineers to determine that the configuration management process was being conducted in accordance with procedures. The inspectors reviewed selected aspects of the following documents:

- MCP-30379, "Construction or Modification Change Control," Version 1.0, dated May 30, 2006
- MCP-30131, "Safety/Licensing Evaluation of Facility Changes," Version 2.0, dated October 14, 2005
- E15-03-002, "ISA Program Standard," Version 2.0, dated April 29, 2006
- E04-06-004, "Preparation and Review of NCS Documents," Version 2.0, dated April 7, 2006
- E04-06-005, "Review of NCS Implementing Documents," Version 2.0, dated March 30, 2006

b. Observations and Findings

The inspectors verified that the licensee configuration management program required maintenance of documentation that defined system configuration and operations. The inspectors also verified that the licensee configuration management program requires that NCS staff provide guidance for process design, NCS limits and controls for new and changed operating procedures, and operator training. The licensee uses engineering change notices (ECNs) to implement the configuration management program. The inspectors reviewed selected ECNs and verified that the ECNs were incorporated into NCS analyses as required.

c. Conclusions

Configuration management was adequate for incorporating NCS into the change process and was in accordance with written procedures.

**5.0 Nuclear Criticality Safety Inspections, Audits, and Investigations (88015)**

a. Inspection Scope

The inspectors reviewed licensee internal audit procedures, and records of previously completed audits of fissile operations. The inspectors reviewed selected aspects of the following documents:

- E04-06-002, "Routine Nuclear Criticality Safety Audits," Version 1.0, dated September 15, 2005
- E04-07-200512, "NCS Audit/Inspection Report - December 2005," Version 1.0, dated January 14, 2006
- E04-07-200601, "NCS Audit/Inspection Report - January 2006," Version 1.0, dated February 13, 2006
- E04-07-200602, "NCS Audit/Inspection Report - February 2006," Version 1.0, dated March 10, 2006
- E04-07-200603, "NCS Audit/Inspection Report - March 2006," Version 1.0, dated April 10, 2006
- E04-07-200604, "NCS Audit/Inspection Report - April 2006," Version 1.0, dated May 16, 2006
- E04-07-200605, "NCS Audit/Inspection Report - May 2006," Version 1.0, dated June 16, 2006
- E04-07-200606, "NCS Audit/Inspection Report - June 2006," Version 1.0, dated July 18, 2006

b. Observations and Findings

The inspectors observed that NCS audits were conducted in accordance with 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. The NCS audits also included a review of NCS postings and labels. The inspectors noted that audits were conducted such that each area of the



facility would be audited at least biennially as required by the license.

c. Conclusions

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

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

a. Inspection Scope

The inspectors reviewed a recent incident in the dry conversion facility where NCS controls were involved or affected. The inspectors reviewed selected aspects of the following documents:

- E04-NCSA-830, "Dry Conversion Powder Preparation," Version 4.0, dated March 16, 2006
- NCS Infraction No. 2005-102, Condition Report No. 2005-5553

b. Observations and Findings

On December 10, 2005, an error in the computer system at the dry conversion facility line 4 powder addback hood allowed the transfer valve to the blender receiver vessels to be opened without properly checking the moisture value of the powder. The powder that was physically at the station met the moisture limits. However, the transfer valve was in the open position before the moisture limit was verified, thus the system would have allowed the transfer regardless of moisture content. The transfer valve opens with an input from the operator through a pushbutton and an input from the moisture verification program. The licensee determined that an operator did not close the transfer valve after completing the previous transfer and the moisture verification program left the valve enabled. Corrective actions included: (1) changes to the moisture verification program requiring the operators to reinitialize the sequence for each drum; and (2) operator training on the revised procedure.

Three items relied on for safety (IROFS) were credited in the NCS analysis for preventing this accident sequence. The event resulted from a failure of the IROFS requiring the nuclear inventory management system (NIMS) to verify acceptable moisture content before permitting a transfer. The two remaining IROFS were (1) the requirement that all drums of uranium powder have at least two determinations that they contain less than 1 wt% moisture and are stored in locked storage grids to prevent accidental movement; and (2) the requirement of a second over check to verify the correct drum is selected by an independent operator. The inspectors determined that the two remaining IROFS functioned appropriately during the event. The inspectors determined that the event was of low safety significance because no uranium powder was transferred.

c. Conclusions

The inspectors did not identify any safety concerns related to licensee event followup.

**7.0 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:

- E04-05-01, "Nuclear Criticality Safety Standards," Version 5.0 dated March 31, 2006

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

The licensee training management system assures that general plant workers and fissile material handlers complete required general NCS training.

**8.0 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. During a subsequent inspection, the inspector determined that qualitative analysis was not adequate for demonstrating the impact of hydrocarbons on the licensee benchmark set. The inspector determined that a more quantitative method, such as recalculating bias for the example or licensee benchmark sets with hydrocarbon critical experiments included, would be more appropriate to address the issue. During a subsequent inspection, the licensee indicated that a company-wide strategy for establishing subcritical limits was planned and that the item would not be resolved until October 2006. During this inspection, the licensee acknowledged that no work had been done to close this item. The inspectors indicated that this may need to be resolved in licensing space during the upcoming license renewal. 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. The licensee determined that there were four apparent causes for the violation: (1) the Integrated Safety Analysis (ISA) Team Leader walked down the process with only the project engineer, rather than with all ISA Team members, (2) the Team Leader unilaterally developed the 'complete' list of hazards and sequences, which did not include the sequence in the violation, (3) the ISA Team members did not recognize that an accident sequence was missing from the list, and (4) due to no requirement for second party walkdown, the independent reviewer did not recognize that an accident sequence was missing from the list. These apparent causes were exacerbated because there had been no refresher training for ISA Team Leaders or ISA Team members since the initial training in 2000. The licensee addressed the first three apparent causes by establishing work practice documents that deal with accident scenario identification and evaluation and by informally training ISA Team Leaders and ISA Team members to the new work practice documents. The licensee is in the process of developing a formal refresher training course to address these issues. This item remains open.

#### **IFI 70-1257/2006-005-05**

This item tracks the licensee's corrective actions for the May 2006 reportable event in which potential backflow to an unfavorable geometry vessel for a process system in the ELO building was not a postulated accident sequence in the ISA. The system configuration in place did not have sufficient IROFS designated to ensure that the performance requirements of §70.61 were met. During the inspection, the inspectors noted that the root cause analysis is still in progress and should be finalized within the next few months. The process remains shut down and the potential for similar reverse flow conditions in the ADU process and the bulk chemical storage tank area was evaluated. The licensee determined that no items would preclude restart of the chemical processes in the UO<sub>2</sub> building. The licensee plans modifications to the system to ensure sufficient IROFS are in place to prevent backflow. The licensee also plans to develop a formal refresher training course for ISA Team Leaders and ISA Team members. This item remains open.

## **9.0 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 July 20, 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**

None.

#### **Items Discussed**

- |                                |                                                                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IFI 70-1257/2004-203-03</b> | Tracks the licensee's evaluation of the impact of uranium-hydrocarbon benchmarks.                                                                                                                       |
| <b>VIO 70-1257/2005-203-01</b> | 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. |
| <b>IFI 70-1257/2006-005-05</b> | Tracks the licensee's corrective actions and reviews the root cause analysis for the May 2006 reportable event.                                                                                         |

### **2.0 Inspection Procedures Used**

IP 88015	Headquarters Nuclear Criticality Safety Program
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### **3.0 Key Points of Contact**

#### **AREVA NP, Inc. - Richland**

*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
W. Backus	Training
M. Salisbury	Engineer

#### **NRC**

*H. Felsher	Criticality Safety Inspector, NRC Headquarters
*T. Powell	Criticality Safety Reviewer, NRC Headquarters
*C. Speer	Student Engineer, NRC Headquarters

\*Attended the exit meeting on July 20, 2006

**Attachment**

#### **4.0     List of Acronyms and Abbreviations**

ADAMS	Agency-Wide Document Access and Management System
ADU	Ammonium Diuranate
AREVA NP	AREVA Nuclear Power (company name)
BLEU	blended low-enriched uranium
CFR	Code of Federal Regulation
ECN	engineering change notice
ELO	engineering laboratory operations
IFI	inspection follow-up item
IP	inspection procedure
IROFS	items relied on for safety
ISA	integrated safety analysis
NCS	nuclear criticality safety
NRC	U.S. Nuclear Regulatory Commission
UO <sub>2</sub>	uranium dioxide
VIO	violation