



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

[REDACTED]

05/02/2005

BWX Technologies, Inc.
ATTN: Mr. W. D. Nash, Vice President
and General Manager
Nuclear Products Division
P. O. Box 785
Lynchburg, VA 24505-0785

SUBJECT: NRC INSPECTION REPORT NO. 70-27/2005-003 AND NOTICE OF VIOLATION

Dear Mr. Nash:

This refers to the inspection conducted from February 20 through April 2, 2005, at the Nuclear Products Division facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the enclosed report.

Areas examined during the inspection included: Operations, Management Organization and Controls, Maintenance and Surveillance, Radiation Protection, Material Control and Accounting, Physical Protection, Fire Protection, Transportation, and Emergency Preparedness. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

Based on the results of this inspection, the NRC has determined that four violations of NRC requirements occurred. The violations are cited in enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report. If you contest these violations or their significance, 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 the Regional Administrator, Region II, and the

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Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001, and the NRC Senior Resident Inspector at your facility.

You are required to respond to this letter and should follow the instructions specified in the Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

Thank you for your response dated March 7, 2005, to our Notice of Violation which was issued on February 7, 2005. The reply met the requirements of 10 CFR 2.201 and your corrective actions will be reviewed in an upcoming inspection.

[REDACTED]

Sincerely,

/RA/

David A. Ayres, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

Docket No. 70-27
License No. SNM-42

Enclosures: 1. Notice of Violation
2. NRC Inspection Report

cc w/encls:
Leah R. Morrell
Manager, Licensing and Safety Analysis
BWX Technologies
P. O. Box 785
Lynchburg, VA 24505-0785

Distribution w/encls: (See Page 3)

[REDACTED]



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SISP REVIEW COMPLETE: Initials: DAA SISP REVIEW PENDING*: Initials: _____ *Non-Public until the review is complete

ADAMS: Yes ACCESSION NUMBER: _____

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NOTICE OF VIOLATION

BWX Technologies, Inc.
Lynchburg, Virginia

Docket No. 70-27
License No. SNM-42

During an NRC inspection conducted on February 20 through April 2, 2005, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

- A. Safety Condition S-1 of NRC license SNM-42 authorizes the use of nuclear materials in accordance with Chapters 1-8 of the License Application submitted on July 14, 1995, and supplements thereto.

Section 4.1.2 of the License Application states that activities involving special nuclear materials are conducted according to the limits and controls specified on the nuclear criticality safety postings.

Contrary to the above, on January 11, an unfavorable geometry container was brought into the Uranium Recovery facility without the proper review in accordance with the requirements of the nuclear criticality safety posting. In addition, the corrective actions for a previous container control violation were inadequate to prevent this violation.

This is a Severity Level IV violation (Supplement VI).

- B. Safety Condition S-1 of NRC license SNM-42 authorizes the use of nuclear materials in accordance with Chapters 1-8 of the License Application submitted on July 14, 1995, and supplements thereto.

Section 2.7 of the License Application states that activities involving licensed materials shall be performed in accordance with written and approved procedures.

Contrary to the above the licensee failed to conduct activities involving licensed materials in accordance with written and approved procedures as described in the following examples:

1. Quality Work Instruction 5.1.12, Change Management, Section 7.1, requires the originator to list equipment affected by the change, and if described by a Safety Analysis Report, include an assessment of the process description and controls maintenance tables. In addition, Form - 51, "Change Review Minutes," requires a licensing review of documents involving changes to the Safety Analysis Report.

On July 15, 2004, Change Request 1017442 was approved to remove the [REDACTED] condensate tank from the Uranium Recovery area. The originator failed to identify that multiple Safety Analysis Reports existed for the area or to include an assessment of the process descriptions and controls maintenance tables. The originator also failed to include licensing in the review process. As a result, the [REDACTED] Condensate Tank and associated [REDACTED]

[REDACTED]

components were removed without two Safety Analysis Reports being revised to reflect the modification.

2. Operating Procedure 0061242, "Inline Monitor System," required a weekly test of the interlock [REDACTED].

On July 15, 2004, Change Request 1017442 was approved to remove the [REDACTED] from the Uranium Recovery facility. The originator failed to include Operating Procedure 0061242, "In Line Monitor System," in the list of documents that were affected by the change. As a result, the procedure was not revised to remove steps that could not be performed since the equipment had been removed. However, operators continued to use the procedure from July 29, 2004, to March 10, 2005, even though the weekly test of the interlock [REDACTED] could not be performed.

The above two examples constitute a Severity Level IV violation (Supplement VI).

- C. Safety Condition S-1 of NRC license SNM-42 authorizes the use of nuclear materials in accordance with Chapters 1 - 8 of the License Application submitted on July 14, 1995, and supplements thereto.

Section 2.7 of the License Application states that activities at the site involving licensed material shall be conducted in accordance with written and approved procedures.

Operating Procedure 1016063, "[REDACTED] Inline Waste Monitoring System," provided detailed steps for draining the monitor in Item 17.4.3 which do not authorize manipulation of vent valve [REDACTED]. In addition, Item 17.4.2 requires the operator to wear a full face shield when flushing the inline monitor.

Contrary to the above, on March 3, 2005, a Uranium Recovery Process Engineer, demonstrating the inline monitor flushing process to an operator, inappropriately opened vent valve [REDACTED]. The engineer was not wearing a full face shield as required by the procedure and as a result, became contaminated.

This is a Severity Level IV violation (Supplement VI).

- D. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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This is a Severity Level IV violation (Supplement VI).

Regarding Violation A, the NRC has concluded that information regarding the reasons for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence and the date when full compliance will be achieved is already adequately addressed on the docket in the enclosed inspection report. However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Regional Administrator, Region II, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

Regarding Violations B, C, and D, pursuant to the provisions of 10 CFR 2.201, BWX Technologies, 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 a copy 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 previously 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 not be modified, suspended, or revoked, or why such other action as may be proper should 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.

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

Dated this 2nd day of May 2005

[REDACTED]

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-27

License No.: SNM-42

Report No.: 70-27/2005-003

Licensee: BWX Technologies, Inc.

Facility: Nuclear Products Division

Location: Lynchburg, Virginia

Dates: February 20 through April 2, 2005

Inspector: G. Wertz, Senior Resident Inspector
O. Lopez, Fuel Facility Inspector
R. Gibson, Health Physics Inspector
S. Caudill, Senior Fuel Facility Inspector

Approved by: David A. Ayres, Chief
Fuel Facilities Inspection Branch 1
Division of Fuel Facility Inspection

[REDACTED]

[REDACTED]

NRC INSPECTION REPORT 70-27/2005-03

EXECUTIVE SUMMARY

BWX Technologies, Inc., Nuclear Products Division

This inspection included periodic observations conducted by the Senior Resident Inspector during normal and off-normal shifts in the areas of Plant Operations, Management Organization and Controls, Maintenance and Surveillance, Radiation Protection, Material Control and Accounting, Physical Protection, Transportation, and Emergency Preparedness. Specialized inspections were conducted by regional inspectors in the areas of Radiation Protection (February 28 through March 4), Plant Operations (March 7 through March 11), and Fire Protection (March 21 through March 25).

Plant Operations

- The facility was operated safely. The Emergency Operations Center and associated equipment were maintained in a state of readiness. Maintenance work was performed in accordance with radiation work permit requirements. Housekeeping was adequate to ensure routes of egress were clear in case of an emergency (Paragraph 2.a).
 - A violation was identified for inadequate corrective actions. An unfavorable geometry [REDACTED] was brought into the Uranium Recovery facility on January 11 without proper review as required by the nuclear criticality safety posting. This situation was similar to one described by violation 70-27/2004-201-01. The Container Control Program was revised and strengthened to include additional oversight, training, and controls to preclude further container control violations (Paragraph 2.b).
 - Failures of Items Relied on for Safety and management measures were identified, effectively communicated to managers, and resolved in a prompt manner (Paragraph 2.c).
 - Items Relied on for Safety were adequately implemented and maintained (Paragraph 2.d).
 - Plant activities observed were performed safely and in accordance with license requirements. Housekeeping was adequate to not adversely affect radiological safety or facility emergency egress (Paragraph 2.e)
 - A violation was identified when a facility change was performed without the proper review. Equipment was removed without licensing review and Safety Analysis Report revision. In addition, an operator continued to use an operating procedure although steps associated with the removed components could not be performed as written (Paragraph 2.f).
 - Source checks and calibration of the criticality accident detectors were performed at the specified frequencies and in accordance with approved procedures (Paragraph 2.g).
- [REDACTED]

Management Organization and Controls

- Corrective actions to address an inadvertent [REDACTED] solution accumulation in the [REDACTED] were effective. Although an Item Relied On For Safety was challenged, prompt operator action identified and corrected the condition (Paragraph 3).

Maintenance and Surveillance

- [REDACTED] inspection results indicated that the NCS controls [REDACTED] remained effective (Paragraph 4).

Radiation Protection

- The radiological exposure data reported in the Semi-Annual Effluent Monitoring Report was consistent with past exposure data. [REDACTED] for liquid discharges to the [REDACTED] were acceptable (Paragraph 5.a).
 - Radiation Protection program self assessments were implemented in accordance with the license and the regulatory requirements (Paragraph 5.b).
 - The External Exposure Monitoring Program was implemented in a manner to maintain doses As Low As Reasonably Achievable. Exposures were less than the occupational limits in 10 CFR 20.1201 (Paragraph 5.c).
 - Internal exposures were significantly less than the limits of 10 CFR Part 20.1201 (Paragraph 5.d).
 - A violation was identified for an engineer's failure to adhere to a procedure. The engineer incorrectly manipulated a valve, which resulted in [REDACTED] solution splashing onto unprotected areas of his head and face. (Paragraph 5.d).
 - Respiratory protection equipment issuance and training assured that the equipment was only obtained by certified users. Respiratory protection records were adequately maintained (Paragraph 5.e).
 - Radiological safety postings and Radiation Work Permits were properly used to communicate potential hazards and protective equipment requirements to workers. Scrap container labels [REDACTED] operator, and date were appropriate (Paragraph 5.f).
 - The radiation and contamination survey programs were appropriately implemented to protect workers and identify potential radiation hazard areas (Paragraph 5.g).
 - The As Low as Reasonable Achievable Program was properly implemented (Paragraph 5.h).
- [REDACTED]

Material Control and Accounting

- [REDACTED]

Physical Protection

- [REDACTED]

Fire Protection

- The Fire Protection Program was compliant with applicable regulatory requirements (Paragraph 8.a).
- The observed process areas, equipment, and material storage areas were maintained and operated in accordance with applicable Fire Protection Program requirements. The observed fire protection systems and Items Relied On For Safety were functional and maintained properly (Paragraph 8.b).
- Pre-fire plans were compliant with applicable regulatory requirements and were undergoing revision to improve the format and content (Paragraph 8.c).
- Fire brigade training was compliant with applicable regulatory requirements (Paragraph 8.d).
- Off-site emergency response capability [REDACTED] was sufficient. Estimated response times to the licensee were short, based on the results of prior drills and [REDACTED]. The off-site responders had been trained on the potential hazards associated with fighting a fire at the licensee's facility (Paragraph 8.e).

Transportation

- Radiation control technicians identified a shipping package containing neutron sources which had an external radiation level in excess of NRC transportation requirements. No immediate radiological risk was present and the inspection information was provided to the NRC Agreements States Officers for the shipper's region (Paragraph 9).

Emergency Preparedness

- The First Quarter Emergency Exercise demonstrated adequate emergency response capabilities (Paragraph 10).
- [REDACTED]



Attachments:

- Partial Listing of Persons Contacted
- List of Items Opened, Closed and Discussed
- Inspection Procedures Used
- List of Acronyms



[REDACTED]

REPORT DETAILS

1. Summary of Plant Status

a. Routine Operations

Routine fuel manufacturing operations and maintenance activities were conducted in the [REDACTED] process areas, [REDACTED]. Uranium recovery, downblending and other routine operations and maintenance activities were conducted in the [REDACTED] facility.

2. Plant Operations (Temporary Instruction (TI) 2600/006 and Inspection Procedure (IP) 88020)

a. Conduct of Operations - Routine Observations

(1) Inspection Scope and Observations

The inspectors observed various operational activities to determine if the facility was operated safely. The inspectors verified that the Emergency Operations Center (EOC) was maintained in a state of readiness. The inspectors reviewed various operational procedures and records, radiation work permits (RWPs), and nuclear criticality safety (NCS) postings and observed that specific operations were performed safely and in accordance with approved plant procedures and postings. Outside areas were toured and no conditions that could create an undesirable situation or hazard in the event of adverse weather (high winds, cold weather, or flooding), or blocked evacuation pathways were observed. The inspectors observed that equipment and devices used to contain radioactive contamination and airborne radioactivity in fuel processing, UR, and other material access areas (MAAs) were in proper working condition, and that personal protective clothing and dosimetry were issued and properly worn. The inspectors noted that emergency egress routes were adequately clear of debris. Housekeeping was sufficient that no significant hazards were identified. A routine fire safety tour verified that fire hazards were minimized especially in locations containing hazardous chemicals or [REDACTED] special nuclear material (SNM).

(2) Conclusions

The facility was operated safely. The EOC and associated equipment were maintained in a state of readiness. Maintenance work was performed in accordance with radiation work permit requirements. Housekeeping was adequate to ensure routes of egress were clear in case of an emergency.

b. Implementation of Process Safety Controls

(1) Inspection Scope and Observations

The inspectors reviewed nuclear criticality control devices and measures in effect during the inspection period in order to assess the effectiveness of the licensee's program for

[REDACTED]

[REDACTED]

prevention of an inadvertent criticality. The inspectors toured fuel processing, storage, and recovery areas and observed that personnel complied with approved, written NCS limits and controls, especially in areas where the licensee was using administrative controls rather than passive or active engineering controls. The inspectors verified NCS limits were posted and available to the operators. During tours of [REDACTED] areas of the facility, the inspectors observed proper spacing controls, use of storage locations, and identification of SNM.

The inspectors reviewed the licensee's root cause investigation and corrective actions (CAs) resulting from an unfavorable geometry container found in the UR facility. [REDACTED]

[REDACTED]. On January 11, a facility maintenance operator brought a container [REDACTED] into UR without satisfying the special NCS requirements. [REDACTED]. The container was discovered on January 17, removed, and the event was captured in CA 2005-042.

The root cause identified by the investigation team and substantiated by discussion with the facility maintenance operator was a lack of training. [REDACTED] maintenance personnel had not been trained on the special NCS requirements [REDACTED]. As such, a new site-wide Quality Work Instruction (QWI) 12.1.16, "Control of Unfavorable Geometry Equipment in UR," was developed and all personnel granted access to UR were trained. Visible indicators [REDACTED] were required on every container allowed into UR. [REDACTED] indicated the applicable NCS posting control requirement. In addition, only specially trained personnel could authorize the [REDACTED] were trained to restrict any container from UR entry not having [REDACTED]. The new container control program (CCP) and training video were reviewed by NRC Headquarters NCS inspectors and a Region 2 Operations inspector. The resident inspector also reviewed QWI 12.1.16, operating procedure (OP) 1019574, "Control of Item/Container Entry into UR," and the completed training records. All inspectors concluded that the changes enhanced the CCP and, if properly implemented, would be effective to preclude another unauthorized container in UR.

NCS evaluated the container size and determined that a criticality accident remained highly unlikely. The inspectors concluded the same following a review of Safety Analysis Report (SAR), Chapters 15.5 and 15.9. However, entry of the unfavorable geometry container into UR was not authorized as required by NCS posting 15-05-002 and SNM-42, License Application Section 4.1.2, which requires activities to be conducted in accordance with the controls specified on NCS postings. In addition, the inspectors determined that the unauthorized container represented a repetitive problem as CAs associated with a previous violation (VIO 70-27/2004-201-01, Failure to Control Introduction of a Greater Than [REDACTED] into the UR Facility), were inadequate to prevent recurrence of this event. The previous CAs (reference NRC IR 70-27/2004-204, Paragraph 5) were limited to UR personnel and did not include facility maintenance. Therefore, this repetitive failure to control unfavorable geometry containers in accordance with the NCS posting was determined to be a violation of NRC requirements and was cited as VIO 70-27/2005-03-01, Repetitive Failure to Control Unfavorable Geometry Containers in UR.

[REDACTED]

(2) Conclusions

Inadequate CAs resulted in a VIO when an unfavorable geometry [REDACTED] was brought into the UR facility on January 11 without proper review as required by the NCS posting. The CCP was revised and strengthened to include additional oversight, training and controls in order to preclude other container control violations.

c. Management and Administrative Practices (O3.01)

(1) Scope and Observations

The inspectors interviewed plant personnel and reviewed selected unusual incident reports (UIRs) to verify that safety problems were identified, effectively communicated to management, and reported in a timely manner. The inspectors noted that failures of Items Relied On For Safety (IROFS) or management measures were captured in UIRs. The inspectors reviewed recent UIRs related to failures of IROFS and management measures. The inspectors verified that CAs were implemented adequately and in a timely manner, and that management was informed.

(2) Conclusions

Failures of IROFS and management measures were being identified, effectively communicated to managers, and resolved in a prompt manner.

d. Safety Function (O3.02) and Maintenance of Nuclear Criticality Safety Systems (O3.07)

(1) Scope and Observations

The inspectors reviewed selected SARs and inspected a selection of IROFS in the UR facility in order to verify proper implementation. Some of the reviewed IROFS included [REDACTED]. The inspectors noted no safety issues.

The inspectors reviewed functional test instructions, completed tests and inspection records for the reviewed IROFS. The inspectors noted that functional tests were performed at the required frequency and that instructions contained the appropriate amount of detail to perform the test. The inspectors also observed a functional test of the Primary and Raffinate Overflow Columns high/low alarms. No safety problems were identified.

(2) Conclusions

Selected IROFS in UR were adequately implemented and maintained.

Plant Activities (O3.03)

(1) Scope and Observations

The inspectors toured the UR process to assess whether operations were performed safely and in accordance with license requirements.

The inspectors noted that nuclear criticality safety (NCS) postings, radiological signs, and procedures were properly posted or available to the operators. The inspectors did not observe any issues where the housekeeping could affect the radiological safety or emergency egress of the facility. The inspectors observed that plant personnel working in radiological control areas wore dosimetry and the proper personal protective equipment. The inspectors also observed proper spacing practices and controls in storage locations. No safety problems were identified.

(2) Conclusions

Plant activities observed were performed safely and in accordance with license requirements. Housekeeping was adequate to not adversely affect radiological safety or facility emergency egress.

f. Configuration Control (O3.04), Nuclear Criticality Safety Change Control (O3.05), and Operating Procedures (O3.06)

(1) Scope and Observations

The inspectors reviewed recent facility modifications to verify that safety significant modifications were reviewed, approved, and documented according to licensee procedures. The inspectors reviewed the change control documentation for the [REDACTED]. The inspectors also toured and discussed safety controls and requirements with the cognizant engineer. No safety problems were identified.

The inspectors observed operations throughout the UR facility noting that operators complied with NCS requirements. The inspectors also reviewed, discussed with operators, and inspected several OPs for the UR processes in order to verify adequate operator knowledge and configuration control. The inspectors noted that the OPs adequately identified process parameters, startup, routine operations, and shutdown (emergency and normal). The inspectors also noted that operators were knowledgeable of the OPs and safety requirements.

The inspectors reviewed OP-0061242, "In Line Monitor System," Revision 17, with a UR operator and noted that the OP required [REDACTED] of the [REDACTED]. The operator stated that the [REDACTED] functional test could not be performed because the [REDACTED]. The inspectors reviewed the modification described in change request (CR)-1017442 and noted that the tank and associated components were removed on July 2004, but the OP was not revised

[REDACTED]

because the originator failed to include it in the list of affected documents. The inspectors were concerned because the operator continued to use the OP even though actions associated with the [REDACTED] could not be performed.

Additionally, the inspectors noted that the originator also did not include two SARs that were affected by the CR in the list of affected documents. QWI 5.1.12, "Change Management," Revision 8, Section 7.1 requires the originator to list items affected by the change (procedure, component, tooling, fixture, etc.) and, if described by a SAR, include an assessment of the process description and controls maintenance tables. In addition, the originator failed to include licensing in the review process as required by Form - 51, "Change Review Minutes," Revision 6. As a result, the [REDACTED] and associated components were removed from the UR process without revision of the two SARs and OP.

SNM-42 License Condition 2.7 requires activities involving SNM to be performed in accordance with written and approved procedures. OP-0061242 required a [REDACTED] test of the [REDACTED]

QWI 5.1.12 required identification of SARs and OPs affected by configuration changes and a licensing review. Use of an OP when steps could not be completed due to non-existent equipment and failure to perform facility configuration change in accordance with the applicable QWI were two examples of a violation of SNM-42 License Condition 2.7, and was cited as VIO 70-27/2005-003-02, Failure to Conduct Activities Involving Licensed Materials in Accordance with Written and Approved Procedures Which Resulted in an Inadequate Facility Change Review.

(2) Conclusions

A violation of NRC requirements was identified when a facility change was performed without the proper review. Equipment was removed without the associated licensing review and SAR revisions. In addition, an operator continued to use an OP although steps associated with the removed components could not be performed.

g. Criticality Alarm System (03.10)

(1) Scope and Observations

The inspectors reviewed the monthly source check records from July 2004 to February 2005 for the Nuclear Products Division (NPD) criticality detectors to verify that they were performed in accordance with approved procedures and at the specified frequency. The inspectors also reviewed last year's calibration records for the criticality detectors and discussed with licensee personnel the procedures used to perform the source check and calibration. No problems were identified.

(2) Conclusions

Source checks and calibration of the criticality detectors were performed at the specified frequencies and in accordance with approved procedures.

3. **Management Organization and Controls (TI 2600/006)**

a. **Inspection Scope and Observations**

On February 9, a maintenance technician inadvertently bumped open a [REDACTED] control valve to the [REDACTED] while replacing piping insulation. Excess [REDACTED] solution overflowed the drum and collected in a [REDACTED] container. The condition was immediately observed by [REDACTED] operators who stopped the process and promptly notified NCS staff. The solution was removed safely in accordance RWP 05-027.

The inspectors reviewed SAR 15.15 "[REDACTED]," which specified as an IROFS that the material form for the [REDACTED] glovebox was to be limited to [REDACTED]. However, this NCS control was designed to ensure that the [REDACTED] form was maintained prior to the UN material being moved to a container storage [REDACTED]. As such, proper operator action to identify the upset condition [REDACTED] ensured the effectiveness of the IROFS. The inspectors verified that other IROFS associated with the [REDACTED] glovebox had been maintained so that an inadvertent criticality remained highly unlikely.

CAs were captured in CA 2005-148 and included removal of the affected valve handle. An extent of condition review identified an associated solution valve whose handle was also removed.

b. **Conclusions**

Corrective actions to address an inadvertent UN solution accumulation in the Downblending [REDACTED] glovebox were effective. Although an IROFS was challenged, prompt operator action identified and corrected the condition.

4. **Maintenance and Surveillance (TI 2600/006)**

a. **Inspection Scope and Observations**

The inspectors reviewed the results from the annual inspection of the [REDACTED]. The [REDACTED] were inspected in order to verify that the [REDACTED] dimensions remained compliant with NCS requirements. The controlled dimensions included the [REDACTED] as specified in SAR 15.15, "[REDACTED]," table 15.15.4.1.1. The inspectors reviewed the data with the cognizant process and NCS engineers. No discrepancies were observed.

b. **Conclusions**

[REDACTED] inspection results indicated that the NCS controls associated with [REDACTED] width and wall thickness remained effective.

5. **Radiation Protection (TI 2600/006) and Inspection Procedure (IP) 83822**

a. **Semi-Annual Effluent Monitoring Report**

(1) **Inspection Scope and Observations**

The inspectors reviewed the Semi-Annual Effluent Monitoring Report dated February 28, 2005. The total semi-annual effluent exposure reported was 0.164 millirem and was consistent with the results from the previous six month report. The inspectors also reviewed the licensee's methodology for calculating the uranium-235 (U-235) mass and enrichment for radioactive liquids discharged to the Waste Treatment Facility with the responsible [REDACTED] specialist. No discrepancies were observed.

(2) **Conclusions**

The radiological exposure data reported in the Semi-Annual Effluent Monitoring Report was consistent with past exposure data. U-235 enrichment and mass calculation methodology for liquid discharges to the Waste Treatment Facility appeared accurate.

b. **Radiation Protection Program Implementation (R1.01)**

(1) **Scope and Observations**

The inspectors conducted interviews and reviewed licensee documentation to determine the status of self-assessments of the Radiation Protection (RP) program. The inspectors determined that the licensee's Health Physics' staff performed self-assessments of the RP program to determine if the program elements were implemented in accordance with the license and NRC regulations. The inspectors determined that NRC and licensee-identified issues were documented in Radiation Safety Incident Notices (RSINs) and UIRs and tracked via a plant-wide tracking system. Health Physics' observations and management audits of the RP program were performed by the licensee quarterly and the results were provided to the As Low As Reasonably Achievable (ALARA) Committee. The inspectors determined that the self-assessments were effective in verifying program implementation and for aiding managers to track and trend issues as appropriate to ensure compliance with license commitments and regulations.

(2) **Conclusion**

Radiation Protection program self-assessments were implemented in accordance with the license and the regulatory requirements.

c. **External Exposure Control (R1.04)**

(1) **Scope and Observations**

The inspectors had discussions with licensee representatives, reviewed RP procedures, and reviewed personnel exposure data, to determine if exposures were in compliance

with 10 CFR Part 20.1201 limits, and if administrative and physical controls were in place to maintain occupational doses' ALARA.

Based on interviews, procedural reviews, and observations of plant personnel inside radiation control areas, the licensee's monitoring program for external exposure was consistent with the requirements in 10 CFR Part 20. The licensee's dosimetry provider was certified by the National Voluntary Laboratory Accreditation Program. Table 1 below displays the maximum assigned exposure data for calendar years (CYs) 2004 and 2003.

CY 2004 annual external exposures were slightly lower than the exposures for CY 2003 for both the Lynchburg Technology Center (LTC) and NPD. The licensee was well below regulatory requirements. The licensee continues to take actions through its ALARA committee to maintain external exposures below their action limits. No regulatory or license limits were exceeded.

Table 1. Annual Exposures

Year		Deep Dose Equivalent (DDE) - rem	Shallow Dose Extremity (SDE) - rem	Total Effective Dose Equivalent (TEDE) - rem	Collective TEDE (person-rem)	Committed Effective Dose Equivalent (CEDE) - rem
2003	NPD	0.205	0.091	0.572	40.00	0.572
	LTC	1.43	4.84	1.43	8.38	0.000
2004	NPD	0.099	0.000	0.513	24.6	0.513
	LTC	0.775	2.155	0.775	5.299	0.000

The inspectors reviewed the area dosimeter results for the LTC [REDACTED] to determine the activity level during CY 2004 when compared to CY 2003. Based on documentation and an interview with LTC health physics personnel, the dosimeter results for CY 2004 (65.26 rem/year) was slightly lower than CY 2003 (76.63 rem/year). The inspectors determined that the reason for the lower activity level was due to the licensee transferring some of the pending samples from the storage [REDACTED] [REDACTED]. According to the [REDACTED] supervisor, a management plan will be established to process all archived samples back to its customers in order to reduce area exposure to workers.

(2) Conclusion

The external exposure monitoring program was implemented in a manner to maintain doses ALARA. Exposures were less than the occupational limits in 10 CFR 20.1201.

- d. Internal Exposure Control (R1.05)
- (1) Scope and Observations

Routine Inspection

The inspectors reviewed licensee procedures for assessing internal exposure to determine if controls were in place to monitor occupational doses, and verify that the administrative limits were established to control occupational dose ALARA. Exposure data was examined to determine if exposures resulting from various plant operations were exceeding limits in 10 CFR Part 20.

The licensee was granted a license amendment from NRC to use the annual limit on intake and derived air concentration values based on dose coefficients adopted by the International Commission on Radiological Protection (ICRP) as published in ICRP Publication 68. Table 1 shows a decrease in the committed effective dose equivalent for CY 2004 compared to 2003.

Event Review

On Thursday, March 3, 2005, at approximately 8:45 a.m., a UR engineer was training an operator [REDACTED]. During the evolution, the engineer opened vent valve [REDACTED] and splashed raffinate solution onto his forehead, ear and head. The solution contained some nitric acid and low concentrations of enriched uranium. The affected areas were immediately flushed with water and a 1% calcium glutamate was applied. Radiation Control (RC) technicians surveyed the affected areas and detected approximately 300 disintegrations per minute per probe (alpha) on the forehead and the left ear area of the individual. The engineer was then escorted to the licensee's medical facility for evaluation and treatment. Later that afternoon, RC performed additional surveys of the engineer's affected areas and determined that the contamination levels had returned to background levels. RC performed a baseline bioassay urine sample of the engineer and continued to monitor the individual for the remainder of the week.

The inspectors discussed the event with the engineer who indicated that he thought he was authorized to manipulate the valve. However, the inspectors reviewed the applicable procedure, OP-1016063, "[REDACTED] Inline Waste Monitoring System," which provided detailed steps for draining the monitor in Item 17.4.3. Contrary to the operator's actions, the OP did not authorize manipulation of vent valve [REDACTED]. In addition, Item 17.4.2 stated that full face shields were to be worn when flushing the inline monitor which the inspectors determined the engineer had not done.

SNM-42 License Condition 2.7 requires activities involving SNM to be performed in accordance with written and approved procedures. Failure to perform SNM activities in accordance with OP-1016063 resulted in an individual external contamination event and had the potential to result in a more significant internal contamination event. Failure to perform the OP as written was a VIO of SNM-42 License Condition 2.7 which was cited as VIO 70-27/2005-003-03, Failure to Conduct Activities Involving Licensed Materials in

Accordance with Procedural Requirements Which Resulted in a Personnel Contamination Event.

(2) Conclusion

Internal exposures were significantly less than the limits of 10 CFR Part 20.1201.

A violation occurred when a UR engineer failed to adhere to OP requirements and opened a vent valve causing raffinate solution to be splashed onto unprotected areas of his head and face. Although the contamination levels were low, the potential for a more serious internal contamination event existed because the activity was not performed in accordance with the OP.

e. Respiratory Protection (R1.06)

(1) Scope and Observations

Respiratory protection equipment issuance and training verification were examined for adequacy in assuring that equipment was obtained by certified users only. A review of records and interviews with health physics and nurses gave the inspectors a good understanding of the electronic training and procedure system which tracks and verifies respirator training qualifications. No examples were observed of unauthorized use of equipment by untrained personnel or workers with expired training. The inspectors observed the process for requiring a respiratory fit test. The nurse went through the five protocols necessary for being qualified to wear a respirator. No problems were identified.

(2) Conclusion

Respiratory protection equipment issuance and training assured that the equipment was only obtained by certified users. Respiratory protection records were adequately maintained.

f. Postings, Labeling and Control (R1.07)

(1) Scope and Observations

The inspectors reviewed the licensee's program for posting as required by 10 CFR 19.11. Several work locations were examined to determine if radioactive containers were properly labeled and to assess the adequacy of the licensee's compliance with 10 CFR 20.1902, "Posting Requirements." RWPs were reviewed to determine the adequacy of the requirements posted for worker protection.

Observed work areas involving radioactive material or potentially contaminated materials were properly posted and containers labeled. The inspectors observed and discussed with an operator the labeling of scrap material containers used in the [REDACTED] manufacturing area and determined that the labels were affixed appropriately. The labels indicated the [REDACTED], operator, and date.

[REDACTED]

The inspectors also determined through review of records and observations that radiologically controlled areas were properly posted and identified. The inspectors observed work in UR [REDACTED] where the operators were replacing [REDACTED]. The operators were dressed in appropriate protective clothing and were provided respiratory protection in accordance with the RWP. In addition, the inspectors observed an operator clean a glovebox [REDACTED]. The area was posted properly as an airborne area and the workers wore respirators. The RWPs and OP-1015720 and OP-1001766 were implemented properly.

Bulletin boards located in designated areas were posted such that workers could observe documents or obtain details as to where documents could be examined.

(2) Conclusion

Radiological safety postings and RWPs were properly used to communicate potential hazards and protective equipment requirements to workers. Scrap container labels which listed the amount of measured U-235 [REDACTED], the operator, and the date, were appropriate.

g. Surveys (R1.08)

(1) Scope and Observations

The radiation survey program was reviewed to assess the effectiveness of surveys to identify radiation and contamination. During tours of the plant, the inspectors observed an HP perform radiation and contamination surveys for the work done [REDACTED]. Fixed air samples were collected and analyzed in the HP laboratory in accordance with procedure RP-13-02, "Early Air Results." No problems were noted.

(2) Conclusion

The radiation and contamination survey program were appropriately implemented to protect workers and identify potential radiation hazard areas.

h. Implementation of ALARA Program (R1.10)

(1) Scope and Observations

The ALARA program was reviewed to determine if the program and ALARA goals were developed and implemented in accordance with the license. In addition, the program for reinforcing the ALARA concept among employees was assessed. Managers, operators and HPs were interviewed regarding ALARA and demonstrated an adequate knowledge of the ALARA concepts. The 2004 ALARA annual reports were generated quarterly, were reviewed by management, and included detailed ALARA goals and exposure summaries to identify undesirable trends.

[REDACTED]

[REDACTED]

(2) Conclusion

The ALARA program was properly implemented.

6. Material Control and Accounting (TI 2600/006)

■ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

■ [REDACTED]

[REDACTED]

7. Physical Protection (TI 2600/006)

■ [REDACTED]

[REDACTED]

[REDACTED]

■ [REDACTED]

[REDACTED]

8. Fire Protection (IP 80555)

a. Fire Protection Program Management/Organization (O4.O1)

(1) Scope and Observations

The inspectors reviewed the Fire Protection (FP) Program as described in Section 1.9 of the license, Emergency Plan, and relevant procedures. The licensee had qualified management and staff to adequately implement the program. The supervisor

[REDACTED]

responsible for daily FP management met appropriate qualification standards and practical experience in various aspects of FP. The licensee had a system of planning and followup for the timely correction of deficiencies identified by periodic safety audits. A suitable FP equipment maintenance and testing program were in place, and plant staff could readily retrieve files detailing various fire protection systems' testing and maintenance.

(2) Conclusions

The FP Program was in compliance with applicable regulatory requirements.

b. Fire Safety of Processes, Equipment and Storage Areas, and Fire Protection Systems (O4.04, O4.05)

(1) Scope and Observations

The inspectors walked down the Fuel Manufacturing and UR areas and noted there was sufficient coverage by detection and suppression systems,

The installed fire detection and suppression equipment was functional and in adequate material condition. Portable fire extinguishers were fully charged, of sufficient quantity and type for the expected fire hazards, and adequately spaced per National Fire Protection Association standards. Warning signs were in place to inform employees of NCS moderation hazards for use of portable extinguishers. There were sufficient quantities of extinguishing agent

The inspectors reviewed FP IROFS, including inspection, testing, maintenance procedures and records for the IROFS including sprinkler systems and portable extinguishers. No problems were identified.

(2) Conclusions

The observed process areas, equipment, and material storage areas were maintained and operated in accordance with applicable FP Program requirements. The observed fire protection systems and IROFS were functional and maintained properly.

c. Pre-Fire Plan (O4.07)

(1) Scope and Observations

The inspectors reviewed the licensee's pre-fire plans for the Fuel Manufacturing, and UR areas and determined that the plans were in compliance with License Section 1.9.4, "Pre-Fire Planning." The Pre-Fire Plan was under revision to make the information more "user-friendly." The inspectors toured the onsite fire brigade assembly area, including the emergency vehicle garage, and observed that the response equipment, protective clothing, and vehicles were stored appropriately and in satisfactory material condition.

(2) Conclusions

Pre-fire plans were compliant with applicable regulatory requirements and were in revision to improve the format and content.

d. Fire Brigade Training (O4.08)

(1) Inspection Scope and Observations

The inspectors reviewed training subjects, frequency of instructional meetings and drills, and individual training files for [REDACTED] members of the total [REDACTED] member fire brigade. Plant staff maintained current and readily retrievable fire brigade training data, such as course subject matter, frequency of instructional meetings and drills, and other pertinent information for individual brigade members. The inspectors additionally observed that over half of the fire brigade members were also members of offsite volunteer fire departments, which was further evidence of sufficient training. Fire brigade members who missed periodic re-qualification training were removed from the fire brigade until the re-qualification was completed.

(2) Conclusions

Fire brigade training was in compliance with applicable regulatory requirements.

e. Offsite Support

(1) Inspection Scope and Observations

The inspectors toured the [REDACTED] [REDACTED]. Emergency vehicles and equipment were maintained and in good material condition. The inspectors interviewed the Fire Chief about licensee-provided training and familiarization tours, knowledge of the plant's chemical and radiological hazards, and response times to the plant given hypothetical scenarios. The Fire Chief demonstrated appropriate knowledge of these matters, and his estimated response time indicated that his department could provide a timely and effective response. The department members received required training by the licensee. The inspectors also toured the licensee's alternate EOC located at the [REDACTED].

(2) Conclusions

Off-site emergency response staff, equipment and vehicles at the [REDACTED] [REDACTED] were adequate. Response time to the facility was estimated to be short, and the responders had been trained on the potential hazards associated with fighting potential fires at the licensee's facility.

9. **Transportation (TI 2600/006)**

a. **Inspection Scope and Observations**

On February 21, radiation control technicians at the LTC performed a survey of a shipping package containing [REDACTED] Americium-Beryllium neutron sources. The technicians obtained a radiation level one meter from the bottom surface of the package of 12.6 millirem per hour (mrem/hr). This level was a summation of the gamma (1.8 mrem/hr) and neutron (10.8 mrem/hr) contributions and exceeded the requirement of 10 CFR 71.47 (10 millirem). The event was promptly and accurately reported to the NRC in Event Notification 41427. No immediate radiological risk to the public was identified.

The inspectors reviewed the event with LTC radiation control technicians and observed them re-perform radiation surveys of the source container on February 22. The technicians used two different neutron survey instruments (an Eberline PRN-4 and a Far West Technologies REM-500) and obtained similar neutron readings of 14.8 and 15 mrem/hr, respectively, one meter below bottom of the container. The shipper's survey indicated a total radiation dose of nine mrem/hr (eight neutron and one gamma). The inspectors discussed the event with a regional-based health physics inspectors who also reviewed the calibration methodology for both neutron survey instruments. No discrepancies were identified. The inspectors forwarded the inspection information to the Region IV State Agreements Officer for additional review by the agreement state with the shipper.

b. **Conclusions**

Radiation control technicians identified a shipping package containing neutron sources which had an external radiation level in excess of NRC transportation requirements. No immediate radiological risk was present and the inspection information was provided to the NRC State Agreements Officers for the shipper's region.

10. **Emergency Preparedness (TI 2600/006)**

a. **Inspection Scope and Observations**

The inspectors observed the First Quarter Emergency Exercises conducted on [REDACTED]. The scenarios involved hazardous chemicals and radioactive materials. [REDACTED]. Activation of the EOC was prompt, communications were effective and the notifications were done as required by procedure. In addition, use of the Initial Emergency Assessment Flow Chart was done correctly and aided event characterization and communications. The post-exercise critiques effectively captured relevant lessons learned.

b. **Conclusions**

The First Quarter Emergency Exercise demonstrated adequate emergency response capabilities.

11. **Exit Meeting**

The inspection scope and results were summarized on March 4, 10, 25 and April 12, 2005, with Mr. W. Nash, Vice President and General Manager, and/or other members of the licensee's staff. Proprietary documents and processes were reviewed during this inspection and this report has been appropriately marked as such. No dissenting comments were received from the licensee.

[REDACTED]

ATTACHMENT

1. **LIST OF PERSONS CONTACTED**

Licensee

T. Brown, Manager, Engineering
C. Carr, Manager, Administration
R. Coats, Manager, Environmental Protection
R. Cochrane, Manager, Operations
J. Compher, Manager, Industrial Engineering
J. Creasey, Manager, Uranium Processing
L. Duncan, Manager, Nuclear Criticality Safety
R. Hogg, Manager, Downblending Operations
T. Martin, Manager, Security Operations
F. Metz, Manager, RTRT Operations
L. Morrell, Manager, Licensing & Safety Analysis
W. Nash, Vice President and General Manager
T. Nicks, Manager, Security
J. Noel, Manager, NRC Security
S. Peters, Manager, Recovery Operations
C. Reed, Manager, Uranium Processing
S. Schilthelm, Manager, Safety and Licensing
D. Spangler, Manager, Radiation Protection
M. Suwala, Manager, Nuclear Materials Control
D. Ward, Manager, Environment, Safety, Health and Safeguards

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

2. **LIST OF ITEMS OPENED AND CLOSED**

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-27/2005-03-01	Opened/Closed	VIO - Repetitive Failure to Control Unfavorable Geometry Containers in Uranium Recovery (Paragraph 2.b)
70-27/2005-03-02	Opened	VIO - Failure to Conduct Activities Involving Licensed Materials in Accordance with Procedural Requirements Which Resulted in an Inadequate Facility Change Review (Paragraph 2.f)
70-27/2005-03-03	Opened	VIO - Failure to Conduct Activities Involving Licensed Materials in Accordance with Procedural Requirements Which Resulted in a Personnel Contamination Event (Paragraph 5.d)

[REDACTED]

[REDACTED]

70-27/2005-03-04 Opened

VIO - [REDACTED]
[REDACTED]
[REDACTED]

70-27/2005-03-05 Opened

IFI - [REDACTED]
[REDACTED]
[REDACTED]

3. **INSPECTION PROCEDURES USED**





TI 2600/006 Resident Inspection Program for Category I Fuel Cycle Facilities
IP 88020 Regional Criticality Safety Inspection Program
IP 88055 Fire Protection
IP 83822 Radiation Protection

4. **LIST OF ACRONYMS USED**

ALARA	As Low As Reasonably Achievable
CA	Corrective Action
[REDACTED]	[REDACTED]
CR	Change Request
CY	Calendar Year
EOC	Emergency Operations Center
FNMCP	Fundamental Nuclear Material Control Plan
FP	Fire Protection
HP	Health Physics
ICRP	International Commission on Radiological Protection
IFI	Inspector Followup Item
IP	Inspection Procedure
IR	Inspection Report
IROFS	Item Relied On For Safety
LTC	Lynchburg Technology Center
MAA	Material Access Area
NMC	Nuclear Material Control
mrem/hr	millirem per hour
NCS	Nuclear Criticality Safety
NCV	Non-cited Violation
NPD	Nuclear Products Division
OP	Operating Procedure
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
QWI	Quality Work Instruction
RC	Radiation Control
RP	Radiation Protection
RSIN	Radiation Safety Incident Notice
[REDACTED]	[REDACTED]

[REDACTED]



RWP	Radiation Work Permit
SAR	Safety Analysis Report
	
SNM	Special Nuclear Material
	
TI	Temporary Instruction
TP	Treatment Plant
UN	Uranyl Nitrate
UIR	Unusual Incident Report
UR	Uranium Recovery
U-235	Uranium 235
VIO	Violation

