UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

July 16, 2007

Mr. Cary Alstadt
Manager, Columbia Plant
Westinghouse Electric Company
Commercial Nuclear Fuel Division
Drawer R
Columbia, SC 29250

SUBJECT: NRC INSPECTION REPORT 70-1151/2007-002

Dear Mr. Alstadt:

This letter refers to the inspection conducted on March 26-30, April 2-4, and April 16-18, 2007, at the Columbia Fuel Fabrication facility. The purpose of the inspection was to perform a review of the emergency preparedness program to determine whether activities authorized by the license were conducted in accordance with NRC requirements. In addition, a review was performed on the status of the licensee's root cause analysis (RCA) in response to the February 26, 2007, hydrofluoric (HF) acid exposure to a worker. This letter also refers to a medical consultant evaluation of the injured worker.

The inspection consisted of an examination of activities conducted under the license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of the license. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities in progress, and interviews with personnel.

The NRC concurs with your RCA and contributing factors surrounding the event as discussed in your RCA report dated June 27, 2007. Based on the results of this inspection, the NRC has identified six apparent violations (APVs) of NRC requirements and they are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy.

The current Enforcement Policy is included on the NRC's Web site at www.nrc.gov; select **"What We Do, Enforcement,** then **Enforcement Policy."** The APVs discussed in this report involved: (1) the failure to wear adequate personal protective equipment (PPE) while working in a potential HF environment, (2) failure to provide or fax a material safety data sheet (MSDS) in a timely fashion to the responders and the hospital for an HF burned worker, (3) failure to train the nurse on the Hazard Communication Plan (Right To Know), (4) failure to provide the required twelve-months training in 2006, to brigade members and the security guards, (5) failure to maintain current letters of agreement with the off-site support groups, nor were the agreements revised annually and renewed at least every four years, and (6) failure to perform quarterly checks on all emergency equipment and monthly checks on the brigade fire truck, the

hazmat vehicles, and the equipment locker, and failure to keep the self contained breathing apparatus (SCBAs) within their required air pressure range. The circumstances surrounding these APVs, the significance of the issues, and the status of effective corrective actions were discussed with you and those members of your staff on April 18, 2007, and the telephone exit on July 9, 2007.

Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for these inspection findings at this time. In addition, please be advised that the number and characterization of APVs described in the enclosed inspection report may change as a result of further NRC review.

You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding these APVs is required at this time.

In accordance with 10 CFR 2.390 of NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agency-Wide Document Access and Management System (ADAMS) on the Internet at http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

Douglas Collins, Director
Division of Fuel Facility Inspection

Docket No. 70-1151
License No. SNM-1107

Enclosure:
NRC Inspection Report 70-1115/2007-002

cc w/encl:
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J. Henson, RII
R. Gibson, RII

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ADAMS: X Yes ACCESSION NUMBER:_____

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SIGNATURE	RGibson for	RGibson for	RGibson for	***/RA/***						
NAME	M. Crespo	C. Taylor	R. Gibson	J. Henson						
DATE	07/13/2007	07/13/2007	07/13/2007	07/16/2007						
E-MAIL COPY?	YES	YES	YES	YES	YES	NO	YES	NO	YES	NO

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	70-1151
License No.:	SNM-1107
Report No.:	70-1151/2007-002
Licensee:	Westinghouse Electric Company
Facility:	Columbia Fuel Fabrication Facility
Location:	Drawer R Columbia, SC 29250
Date:	March 26 - 30, April 2 - 4, and April 16 - 18, 2007
Inspectors:	Manuel Crespo, Senior Fuel Facility Inspector Cynthia Taylor, Fuel Facility Inspector Richard Gibson, Jr., Senior Fuel Facility Inspector Diana Diaz-Toro, Nuclear Material Safety and Safeguards
Approved by:	Jay L. Henson, Chief Fuel Facility Inspection Branch 2 Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Commercial Nuclear Fuel Division
NRC Inspection Report 70-1151/2007-02

This routine, announced inspection was conducted in the area of emergency preparedness at the Westinghouse Columbia facility. In addition, a special, announced inspection was conducted to review the status of the licensee's root cause analysis (RCA) in response to the February 26, 2007, hydrofluoric (HF) acid exposure to a worker. The inspections involved observation of work activities, a review of selected records and procedures, interviews with plant personnel and offsite support agencies, a review of the integrated safety analysis (ISA) and ISA summary, and a medical evaluation by a medical consultant.

Hydrogen Fluoride Event Description

- On February 26, 2007, an employee was exposed to HF acid to the right arm that caused the employee to go to the hospital. The employee was treated at a local hospital and released the next day. The operator did not report any adverse problems from the injury (Paragraph 2.a).

- Three apparent violations (APVs) were identified as a result of the licensee's response to an HF acid exposure that occurred on February 26, 2007. The APVs involved the following: (1) failure to use appropriate personnel protective equipment during cylinder operations, (2) failure to provide material safety data sheet information to first responders prior to their arrival at the hospital, and (3) failure to train the plant nurse on her responsibilities as outlined in the Hazard Communications Procedure (Right to Know) (Paragraph 2.b).

- The licensee implemented an adequate HF event root cause investigation. An inspector followup item (IFI) was opened to review the licensee's implementation of the long term corrective actions (Paragraph 2.c).

Medical Consultant Evaluation

- A medical consultant was hired by the NRC to evaluate the severity of the HF acid burn to a worker. The injured worker was a 28-year old male who sustained a severe HF injury to the right forearm. The burn was < 1% body surface area (BSA) and the worker sustained the chemical injury while working with uranium hexafluoride (UF_6) and HF (49% HF solution) in the fuel manufacturing conversion area. According to the medical consultant, severe burns occur after exposure of concentrated (i.e., 50% or stronger solution) HF acid to 1% or more BSA, exposure to HF acid of any concentration to 5% or more BSA, or inhalation of HF acid fumes from a 60% or stronger solution. The consultant believes that the HF burn did not endanger the life of the worker (Paragraph 3).

Emergency Preparedness

- One APV was identified regarding brigade members missing their required twelve-month frequency training in 2006, for hazmat refresher, fire extinguisher, flammable liquid, respiratory protection and first aid. In addition, security guards were not given training on an annual basis on the security aspects of the plan (Paragraph 4.a).

- One APV was identified regarding the licensee's failure to maintain current letters of agreement with the off-site support groups. These agreements were not revised annually or renewed at least every four years (Paragraph 4.b).

- One APV was identified regarding the licensee's failure to perform quarterly checks on all emergency equipment and monthly checks on the brigade fire truck, the hazmat vehicles, and the equipment locker. Also, several emergency self contained breathing apparatus (SCBAs) with an air pressure rating below the requirement were found in the health physics (HP) emergency cabinets, the emergency fire truck, the hazmat vehicles and the equipment locker (Paragraph 4.c).

ISA Summary Review

- The NRC staff determined that the licensee adequately considered the consequences to a worker exposed to HF through inhalation, ingestion, and dermal routes. The ISA summary identified the most prevalent route associated with a release of UF_6 to be inhalation. Therefore, accident sequences resulting from the inhalation of HF exceeding the emergency response planning guidelines (ERPGs) were further evaluated in the ISA Summary (Paragraph 5).

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

REPORT DETAILS

1. Summary of Plant Status

The Westinghouse Facility fabricates low-enriched uranium fuel into fuel assemblies for use in both pressurized and boiling water reactors. During the inspection period, a maintenance person was potentially exposed to hydrofluoric acid and taken to the hospital as a precaution. The licensee's response was adequate and timely. It was later determined that the maintenance person was simply exposed to water.

2. Hydrofluoric Acid (HF) Event Description

a. HF Exposure to a Worker

(1) Scope and Observations

On Monday, February 26, during third shift at approximately 3:10 a.m., in the Manufacturing Conversion and Scrap area, an operator sustained a chemical burn while working with a uranium hexafluoride (UF_6) cylinder on the line four vaporizer. The cylinder had been taken offline due to inoperability of the nitrogen eduction system (Straham valve failure). At the time, the operator was wearing long sleeve coveralls and chemically resistant gloves that covered an area just beyond his wrist. The coveralls were not chemically resistant and his arms were in a tent sleeve that did not fully cover the region below his elbow. After completion of his work, the operator experienced itching on his right arm and observed crystals on his sleeve. After further evaluation of the sleeve on his right arm, the operator noticed reddening and blistering of the skin under the sleeve. After flushing his arm with water, he informed the Chief Operator and Team Manager for the area. Suspecting an HF burn, the Team Manager sent the operator to the shower for further decontamination and notified an on-site first responder. The on-site responder applied a topical application of Calcium Gluconate (CG) to the operator's burn and notified the local EMS who arrived on the site at approximately 4:15 a.m. During this time, a second topical application of CG was applied to the affected area by the on-site first responder and the operator was taken to the hospital.

The operator arrived at the hospital at 4:45 a.m. Initially, the hospital did not have a tube of CG available nor had a material safety data sheet (MSDS) been sent from Westinghouse. The hospital treated the operator with CG around 6:00 a.m. After repeated requests from the hospital and the poison control center, Westinghouse faxed the MSDS information around 8:00 a.m., about one hour after the initial request.

At the hospital, the operator received an initial EKG and blood tests whose results were both normal. After review of the MSDS information, 1st shift doctors decided to keep the operator for observation and more blood tests. The results of additional blood testing showed slightly elevated calcium levels and normal levels of potassium and magnesium. In the afternoon, the operator began to experience increased pain from the HF burn and the doctors administered CG subcutaneously. Doctors eventually had to administer a regional nerve block for additional pain control. Follow-up blood test results showed

normal calcium levels after a couple of hours. At 3:00 p.m., the operator was admitted to the hospital for overnight observation and released on February 27, 2007, to be followed up by the patient's private physician. The operator did not report any adverse problems from the injury.

(2) Conclusion

On February 26, 2007, an employee was exposed to HF acid to the right arm that caused the employee to go to the hospital. The employee was treated at a local hospital and released the next day. The operator did not report any adverse problems from the injury.

b. HF Event Response

(1) Scope and Observations

After initial review of incident documentation, interviews of licensee's staff, and internal procedures, specifically, plant operations in the conversion area, and emergency response procedures, the inspectors determined that one violation had occurred during the event and two violations had occurred when responding to the event.

For the conversion area, Procedure, "UF_6 Cylinder Installation and Removal" COP-810098, revision 32, Section 5, require the operator not perform activities without wearing the proper protective equipment, fresh air respirator and chemical gloves at a minimum. Based on interviews with the injured operator, personnel working in the area and management, the operator was allowed to wear short chemical gloves and was required to use the tent sleeves located above the cylinder. The short chemical gloves were inadequate in that neither the gloves nor the tent sleeves fully covered the region below the elbow when arms were fully extended. The operator should have used long chemical gloves to prevent the exposure to HF, but was not required per procedure, COP-810098, Rev. 32. Failing to use adequate personnel protective equipment was identified as an **Apparent Violation (APV) (APV 70-1151/2007-002-01)**. Since the event, licensee management now requires operators to don shoulder length gloves when manipulating cylinder connections. The inspectors found this new requirement to be adequate to address the immediate chemical safety concern.

For emergency response, Westinghouse Emergency Plan, Rev.13, Section 4.27.6 required the licensee to provide the material safety data sheet (MSDS) information to off-site responders or fax a copy to the hospital prior to arrival of an employee. Based on interviews with the licensee's staff, the MSDS was not provided to the off-site responders nor was it faxed to the hospital prior to the arrival of the operator. The MSDS information was faxed at or about two hours after the operator arrived. The failure to follow the Westinghouse Emergency Plan, Rev.13 was identified as an APV **(APV 70-1151/2007-002-02)**. During the inspection, another potential HF event occurred. An operator became contaminated in the neck region just below his face-shield while attempting to disassemble a valve in the recovery area. At the time of the work, the HF had been purged and drained from the system, lab analysis results of the liquid showed only water present in the liquid not HF. The inspectors noted that the

licensee had appropriately responded to the event and gave the off-site emergency responders the MSDS information in a timely fashion and a Westinghouse representative accompanied the individual to the hospital. The individual was later released that day.

Procedure, "Hazard Communication (Right To Know)," SYP-110, Rev. 6 requires the licensee's employees, contractors, and vendors to be trained and informed of their rights under the hazard communication standard. Specifically, the plant's nurse was required to ensure MSDS information was available for emergency medical personnel when treating exposed employees and provide information as requested concerning health effects and exposure symptoms listed on the MSDS.

Based on interviews with the plant nurse and licensee's staff, the nurse was unaware of her responsibilities in the Hazard Communication procedures, and the team manager, working on 3rd shift, when asked to provide the information to the hospital and poison control center felt that providing the MSDS warranted following the "Outside Contact Protocol" meaning that any information should come from the human resources communications specialist. These actions consequently delayed providing the MSDS information in a timely manner to the hospital and poison control center. The failure to train the licensee's staff on the requirements of the Hazard Communication procedure (Right to Know) was identified as an APV **(APV 70-1151/2007-002-03)**.

(2) Conclusion

Three APVs were identified as a result of the licensee's response to an HF acid exposure that occurred on February 26, 2007. The APVs involved the following: (1) failure to use appropriate personnel protective equipment during cylinder operations, (2) failure to provide MSDS information to first responders prior to their arrival at the hospital, and (3) failure of the licensee to train licensee's staff, specifically, the plant nurse and 3rd shift team manager on their responsibilities as outlined in the Hazard Communications Procedure (Right to Know).

c. HF Event Root Cause

(1) Scope and Observations

The inspectors reviewed the licensee's final root cause analysis report (CAPs-RCA-07-057-C001. Rev. 3). The report appeared to adequately identify the root causes of the event. The event was the result of an unnoted internal failure of the valve stem of the cylinder and the use of inadequate personal protective equipment (PPE). The licensee had already implemented immediate corrective actions to address the inadequate PPE and has augmented operator training on HF burn protocol. The licensee's planned long term corrective actions, in part, involving the assessment of proper PPE for the entire chemical area, the addition of chemical hazards and responses to job training requirements, and standardization of MSDSs in the plant to ensure consistent responses to chemical exposures. In order to track the licensee's long term corrective actions, an inspector follow-up item (IFI) will be opened (IFI 2007-002-004).

(2) Conclusion

The licensee implemented an adequate HF event root cause investigation and has planned adequate long term corrective actions. An IFI was opened to review the licensee's implementation of the long term corrective actions.

3. Medical Consultant Evaluation

(1) Scope and Observations

The medical consultant provided the following information in his report: HF acid is one of the strongest inorganic acids. HF acid burns are a unique clinical entity. Dilute solutions deeply penetrate before dissociating, thus causing delayed injury and symptoms. Severe burns occur after exposure of concentrated (i.e., 50% or stronger solution) HF acid to 1% or more body surface area (BSA), exposure to HF acid of any concentration to 5% or more BSA, or inhalation of HF acid fumes from a 60% or stronger solution. The two mechanisms that cause tissue damage are corrosive burns from the free hydrogen ions and chemical burns from tissue penetration of the fluoride ions.

Fluoride ions penetrate and form insoluble salts with calcium and magnesium. Soluble salts also are formed with other cations but dissociate rapidly. Consequently, fluoride ions release, and further tissue destruction occurs. Local effects include tissue destruction and necrosis. Burns may involve underlying bone. Systemic fluoride ion poisoning from severe burns may be associated with hypocalcemia, hyperkalemia, hypomagnesemia, and sudden death. Deaths have been reported from concentrated acid burns to as little as 2.5% BSA.

Pre-hospital treatment for HF acid burns includes basic life support and appropriate decontamination, followed by neutralization of the acid by liberal use of topical calcium gluconate. The patient should be transported immediately to the nearest appropriate medical facility.

Emergency department care includes irrigation of the site with copious amounts of water and assessment and management of life-threatening conditions. Comprehensive patient monitoring is necessary for significant exposures. With any evidence of hypocalcemia, one should immediately administer 10% calcium gluconate IV. For topical management of the burn, it is prudent to apply 2.5% calcium gluconate gel to the affected area. If pain persists for more than 30 minutes after application of calcium gluconate gel, further treatment is required.

Subcutaneous infiltration of calcium gluconate is recommended at a dose of 0.5 mL of a 10% solution per square centimeter of surface burn extending 0.5 cm beyond the margin of involved tissue. A Bier block is useful for pain control. Continuous EKG and clinical monitoring are essential during the initial, possibly unstable phase.

As a result of this HF exposure, the operator received topical, subcutaneous injections, and intravenous applications of calcium gluconate as well as significant pain management treatments.

The HF burn in this case has healed well and there currently exists a 2-3 cm diameter fibrotic scar on the right forearm.

(2) Conclusion

According to the medical consultant, severe burns occur after exposure of concentrated 50% or stronger solution HF acid to 1% or more BSA, exposure to HF acid of any concentration to 5% or more BSA, or inhalation of HF acid fumes from a 60% or stronger solution. In this case, the burn was < 1% BSA and the worker sustained the chemical injury while working with UF_6 and HF (49% HF solution) in the fuel manufacturing conversion area. The consultant characterized this injury as a serious HF burn, but did not believe that the HF burn endangered the life of the worker.

4. Emergency Preparedness (IP 88050) (F3)

a. Training and Staffing of Emergency Organization (F3.03)

(1) Scope and Observations

Emergency response training was reviewed to determine if the licensee had provided adequate training to personnel designated as the primary and/or alternate members of the Emergency Response Organization (ERO). In addition, emergency response training records were reviewed for a random sampling of personnel assigned to the Emergency Response Team (Brigade members).

The inspectors conducted interviews with several members of the emergency response teams including brigade members and team leaders. The response team members were knowledgeable regarding their roles and demonstrated that the radiation safety training provided adequate instruction for performing radiation surveys in the absence of radiation protection personnel. The inspectors determined that the interviewees were familiar with the criticality alarms, the evacuation route, and the accountability reporting location.

The inspectors reviewed the training matrix for the Brigade members who were qualified to respond to an emergency event. The inspectors determined that several brigade members had missed their required twelve-month frequency training in 2006, for hazmat refresher, fire extinguisher, flammable liquid, respiratory protection and first aid training. In addition, the inspectors determined that security guards were not given training on an annual basis on the security aspects of the plan.

Subsection 7.2.4 of the Site Emergency Plan, “Emergency Response Team Training,” requires Emergency Response Team Training to be in accordance with 29 CFR 1910.156 and 29 CFR 1910.120 (to the technician level). The training sessions will be conducted a minimum of four times per year under the direction of the Environment,

Health and Safety Department. In addition, Subsection 7.2.5 "Security Training," requires that all security personnel be given training on an annual basis to cover security aspects of the plan. Failure to provide the required twelve months frequency training, in 2006, to the Brigade members and the security guards was an APV of NRC license application requirements **(APV 70-1151/2007-002-05)**.

(2) Conclusion

Based on interviews and training documentation, emergency response training in general was adequate. Personnel selected for review were trained in accordance with procedures. However, two examples of an APV were identified regarding the failure to provide the required twelve months frequency training, in 2006, to the Brigade members and the security guards.

b. Offsite Support (F3.04)

(1) Scope and Observations

Licensee activities in the areas of training, agreements, and exercises were reviewed to determine if the licensee was periodically involving offsite support groups.

The inspectors reviewed offsite support training records and determined that annual training was provided to offsite support in accordance with the Site Emergency Plan and procedures. The inspectors also determined that site familiarization tours were provided to offsite fire support groups and rescue personnel, and that the incident commanders for the licensee were allowed to accompany the Columbia firefighters on fire emergencies. The radiation safety training provided to offsite response personnel was adequate and provided the appropriate level of understanding regarding the potential hazards that may be encountered during an onsite response.

The inspectors determined that written agreements with offsite support groups were not maintained current in accordance with the Site Emergency Plan. Section 4.27 of the Site Emergency Plan requires, in part, that written agreements be made with the off-site groups and the licensee to ensure that there is a clear understanding of assigned responsibilities in the event of an emergency. The Emergency Program Administrator maintains current letters of agreement with off-site support groups. The agreements will be revised annually and renewed at least every four (4) years or as frequently as needed. Failure to maintain current letters of agreement with the off-site support groups, and the failure to revise annually and renew the agreements at least every four years was an APV of NRC licensed application requirements **(APV 70-1151/2007-002-06)**.

(2) Conclusion

Based on interviews and records reviewed, the licensee's interface with offsite support groups was properly maintained. However, one APV was identified regarding the licensee failure to maintain current letters of agreement with the off-site support groups, and the agreements were not revised annually and renewed at least every four years.

c. Emergency Equipment and Facilities (F3.06)

(1) Scope and Observations

Emergency response equipment, instrumentation, vehicles and supplies used to evaluate and assess radiological conditions were examined to determine if they were maintained in a state of operational readiness.

The licensee's emergency equipment and kits were inspected in the Emergency Operations Center, Conference Room 101, brigade fire truck and hazmat vehicles, and the brigade facility at the plant. The inspectors observed an inventory and operability check of equipment at select locations and noted that survey instruments were operational. The inspectors also observed that the respiratory protection equipment, air samplers, etc., and supplies were checked for shelf-life, reliability and quantity, and found to be maintained in a state of operational readiness. However, the inspectors determined that the licensee failed to maintain quarterly checks on emergency equipment, monthly checks on the brigade fire truck, the hazmat vehicles and the equipment locker, and several emergency SCBAs with a rating of 2216 psi were found in the health physics emergency cabinets, the emergency fire truck, the hazmat vehicles and the equipment locker to be below the 2000 psi air pressure requirement. The pressure of the SCBAs observed by the inspectors were between the range of 1850 psi to 1950 psi.

Emergency Preparedness Implementing Procedure SEP-004, "Emergency Equipment and Supplies," Rev. 2, required in Subsection 6.2.1 that Quarterly checks shall be conducted on all emergency equipment. Subsection 6.2.3 required that monthly checks be performed for the Emergency Brigade fire truck, Hazmat vehicles and the equipment locker in the Emergency Response facility. Subsection 6.4.3 required that each SCBA's cylinder shall be kept in the "FULL" range. A cylinder rated for 2216 psi shall have at least 2000 psi of air. Failure to perform the required quarterly and monthly checks were identified as an APV of NRC license application requirements **(APV 70-1151/2007-002-07)**.

(2) Conclusion

Based on the equipment operability checks and documentation for maintenance and calibration, the inspectors determined that in general, the reliability of selected equipment was good and the equipment was maintained in a state of operational readiness. However, one APV was identified regarding the licensee's failure to perform quarterly checks on all emergency equipment and monthly checks on the brigade fire truck, the hazmat vehicles, and the equipment locker. Also, several emergency SCBAs with an air pressure rating below the requirement were found in the HP emergency cabinets, the emergency fire truck, the hazmat vehicles and the equipment locker.

5. Integrated Safety Analysis (ISA) Summary Review

(1) Scope and Observations

The ISA and ISA Summary were reviewed to determine how the HF event that resulted in the exposure to a worker, on February 26, 2007, was considered and evaluated in the ISA and ISA Summary. The staff focused the review on the following: hazards and accident sequence evaluation, consequence analysis methods, Items Relied On For Safety (IROFS) designated for the ammonium diuranate (ADU) conversion system, incident documentation, internal operating procedures, and interviews with the licensee staff.

The NRC staff reviewed the process hazards analysis (PHA) that the licensee performed in the ADU conversion system. The PHA identified the process hazards and consequences from a release of UF_6 resulting in an HF exposure to a worker through the different exposure pathways (i.e., inhalation, ingestion, dermal, eye). The MSDS for HF was used to identify the hazards, health effects, exposure routes, and protective measures discussed in the PHA.

The NRC staff reviewed the accident sequences, consequences, and IROFS designations discussed in the ISA. The ISA documentation incorporated the information associated with the PHA of the potential HF event and the HF MSDS. The ISA discussed the consequences resulting from a catastrophic UF_6/HF release, such as a cylinder/valve/pigtail rupture, as well as events resulting in small UF_6/HF releases, such as material handling events, that could result in consequences to a worker exceeding the performance requirements of 10 CFR 70.61.

The NRC staff also reviewed the safety significant controls in the vaporization process that protect the operator from HF exposure through various routes. These controls include the ventilation tent, proper personnel protective equipment, a fresh air respirator and chemical gloves, safety showers, and a medical treatment kit for HF burns. Other safety significant controls include the structural integrity of the cylinder and the pigtail, as well as the visual inspection of the cylinder, the valve, and pigtail connection. The licensee also performs a leak check sequence to all connections after the pigtail has been connected to the cylinder valve.

The NRC staff and the licensee discussed the assessment of the consequences from these accident sequences as well as for the HF event on February 26, 2007. As part of the licensee's ISA methodology, consequences from accident sequences were determined and then compared to the chemical quantitative standards (ERPG) proposed in the ISA plan and the ISA Summary. Consequences exceeding the ERPGs are documented in the ISA Summary and adequate IROFSs are designated to prevent and mitigate the consequences of the accident sequence. The ISA summary identified the most prevalent hazard from a UF_6 release to be the inhalation of HF. Thus, ERPGs were used to assess the consequences to the worker from HF exposure through the inhalation route.

(2) Conclusion

The NRC staff determined that the licensee adequately considered the consequences to a worker exposed to HF through inhalation, ingestion, and dermal routes. The ISA Summary identified the most prevalent route associated with a release of UF_6 to be inhalation. Therefore, accident sequences resulting from the inhalation of HF exceeding the ERPGs were further evaluated in the ISA Summary.

6. Follow-up Items:

(a) (IFI) 70-1151/2005-08-02

This item involved the inability to clearly hear the voice communication system (VCS) in the conversion area during normal operation. During discussion with the licensee, the licensee indicated that modifications were made to the VCS, in that, it was clearer in the conversion area. However, the inspectors determined while standing in the conversion area, that the VCS was not as clear as indicated in the aft areas of the conversion lines. The licensee agreed and will conduct more modifications. This IFI will remain opened.

(b) (IFI) 70-1151/2006-07-01 -

(1) This item involved developing a formal procedure to perform SCBA monthly inspection. From the last inspection, although monthly inspections documentation was available for review during the last inspection, a formal procedure had not been developed. This item will remain open.

(2) This item involved updating the mutual-aid agreement with the local hospital. From the last inspection, the licensee had not updated their mutual aid agreement with the local hospital, however hospital representatives were aware of the agreement. The item will remain open.

(3) This item involved formal documentation demonstrating that the licensee had attempted to have local law enforcement and emergency management services participate in on-site training. From the last inspection, the licensee's contact with offsite entities was by phone. The item will remain open.

(4) This item involved documentation of training for the emergency preparedness organization and fire brigade. From the last inspection, the documentation was haphazard and not well-organized and documented for these organizations.

7. Exit Meeting Summary

The inspection scope and results were summarized on April 18, 2007, and discussed with the licensee in a telephone exit on July 9, 2007. The inspectors described the areas inspected and discussed the inspection results in detail. Although proprietary documents and processes were reviewed during this inspection, the proprietary nature of these documents or processes is not included in this report. No dissenting comments were received from the licensee.

ATTACHMENT

1. PARTIAL LIST OF PERSONS CONTACTED

*Cary Alstadt, Plant Manager
*Marc Rosser, Manager, Environment, Health and Safety
*Jim Heath, Health Physicist, EH&S
*Gerard Couture, Environment, Health and Safety
*Ralph Winiarski, Manager, Nuclear Criticality Safety Engineer
*Tommy Shannon, Supervisor, EH&S
*Dane Graham, Criticality Technician, EH&S
*Carlos Aguilar, Manager, Conversion/URRS
*Dave Precht, Manager, Operations
*Mark Lindler, EP Coordinator, EH&S

* Denotes those present at the exit meeting on April 18, 2007

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

2. INSPECTION PROCEDURES USED

IP 88050	Emergency Preparedness
IP 88003	Reactive Inspection For Events at Fuel Cycle Facilities Program

3. ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Type	Description
70-1151/2007-02-01	Open	APV	Failure to wear adequate PPE while working in a potential HF environment
70-1151/2007-02-02	Open	APV	Failure to provide or fax an MSDS in a timely fashion to the responders and the hospital for an HF burn employee
70-1151/2007-02-03	Open	APV	Failure to train the nurse on the Hazard Communication Plan
70-1151/2007-02-04	Open	IFI	Tracking the licensee's corrective actions from the root cause analysis
70-1151/2007-02-05	Open	APV	Failure to provide the required twelve-months training to Emergency Response Team (e.g., Brigade members and security guard)

70-1151/2007-02-06	Open	APV	Failure to maintained current letters of agreement with the off-site support groups, revised annually and renewed at least every four years
70-1151/2007-02-07	Open	APV	Failure to perform quarterly checks on emergency equipment, monthly checks on the brigade fire truck, the hazmat vehicles and the equipment locker, and failure to keep the SCBAs within their required air pressure range
70-1151/2005-08-02	Discussed	IFI	Inability to Clearly Hear the VCS in the Conversion Area During Normal Operation
70-1151/2006-07-01	Discussed	IFI	(1) Develop formal procedure to perform SCBA monthly inspections (2) Update mutual-aid agreement with local hospital (3) Develop formal letter soliciting participation in onsite emergency preparedness training for local law and first responders. (4) Standardize formal training documentation for emergency preparedness organization members and fire brigade

4. LIST OF ACRONYMS USED

ADAMS	Agency Document Access and Management System
ADU	Ammonium Diuranate
APV	Apparent Violation
BSA	Body Surface Area
CG	Calcium Gluconate
CFR	Code of Federal Regulations
EKG	Eletro-cardiogram
EMS	Emergency Medical Service
ERO	Emergency Response Organization
ERPG	Emergency Response Planning Guideline
HP	Health Physics
HF	Hydrofluoric acid
IFI	Inspector Followup Item
IP	Inspection Procedure
IROFS	Items Relied On For Safety

ISA	Integrated Safety Analysis
MSDS	Material Safety Data Sheet
NMSS	Nuclear Material Safety and Safeguard
NRC	Nuclear Regulatory Commission
PHA	Process Hazards Analysis
PPE	Personal Protective Equipment
RCA	Root Cause Analysis
Rev	Revision
SCBA	Self Contained Breathing Apparatus
SNM	Special Nuclear Material
UF_6	Uranium Hexafluoride