

R2/D1-7

1

**LICENSEE PERFORMANCE REVIEW FOR WESTINGHOUSE**  
**ASSESSMENT PERIOD: 2/2/98 - 1/8/00**

**I. SAFETY OPERATIONS**

**A. CHEMICAL SAFETY (FCOB/FCSS)**

**1. Chemical Safety Program Strengths**

- Implementation of the Integrated Safety Analysis (ISA) program for chemical processes.
- The licensee's ISAs for chemical systems were thorough in identifying potential hazards, their safety significance, and preliminary recommendations for reducing the likelihood and severity of an accident. Safety significant controls were properly flowed down to plant personnel responsible for their implementation and maintenance. A good practice was developed to identify these controls, associated operability and reporting requirements to the plant staff. IR 99-201
- + Issue Type: POSITIVE FINDING The inspectors reviewed the Guidelines for Preparing a Baseline ISA, as well as portions of the ISAs for the conversion process, uranyl nitrate bulk storage, and chemical receipt, handling and storage systems. Each system was walked down and interviews were conducted with the responsible engineering and operations personnel. No material condition problems were observed by the inspectors. The ISA methodology employed the HAZOP and "what-if" check lists (for human factors and siting issues), and a fault tree analysis for criticality contingency identification. The analysis methodology was in accordance with license commitments and appeared to be technically sound and thorough. The Guidelines identified and described the details in performing the various analyses, such as Chemical Safety within an ISA. The proper terms were defined and the development techniques were identified for performing each analysis. The references were documented. In addition, the expectations of each analysis were included to verify that it was properly done. The Guidelines provided an adequate basis for performing an ISA. While the ISAs did not identify any previously unknown significant safety issues that would require immediate corrective actions, they did identify a number of recommendations to improve the existing safety margins. Overall, the recommendations were prioritized into three generic groups based on risk: (1) those that required action, (2) those that would be performed at management's discretion and (3) those that would be administratively closed without further action. A review of selected recommendations that fell into the first two groups showed that the licensee was conservative in identifying the overall risk. The inspectors also found that the licensee was using the risk matrix to prioritize old legacy issues that were being tracked. The licensee's method for prioritizing safety issues based on risk was found to be acceptable. Each ISA identified a number of safety significant controls. These controls involved both active (interlocks, etc.) and passive engineered controls as well as administrative. The inspectors found that the safety significant controls were being 'flowed down' to the plant personnel responsible for their operation and maintenance through two basic systems; (1) the MAPCON system for scheduling routine maintenance and testing, and (2) Operating Procedure Sketches. The sketches identified the specific control ID number, the control function/failure condition/action, the operating and maintenance procedures, preventive maintenance and calibration requirements, functional testing, and post maintenance/repair testing requirements. During tours of the ADU Conversion and URRS control rooms, the inspectors observed a good practice in the method used by the licensee to identify the safety significant controls and operability requirements to plant personnel responsible for their operation and maintenance. Laminated placards were posted that addressed the specific operability, maintenance, and reporting requirements in a clear and succinct manner. In addition, the operating procedure sketches were similarly posted for quick reference. Discussions with several operators indicated that the instructions were well understood.

07/02/1999

Information in this record was deleted  
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Act, exemptions 2

FOIA-2006-0026

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2

2. Areas Needing Improvement in Chemical Safety Program
  - None
3. Projected Challenges to Performance in Chemical Safety Program
  - Implementation of safety controls identified by the ISA
4. Recommended NRC Effort in Chemical Safety Program Area

## B. NUCLEAR CRITICALITY SAFETY (FCOB/FCSS)

1. Nuclear Criticality Safety Program Strengths
  - None
2. Areas Needing Improvement in Nuclear Criticality Safety
  - Implementation of administrative criticality safety controls.
    - Procedural instructions for sampling the UN bulk tanks lacked detail to ensure sample representativeness. IR 99-06
      - + Issue Type: NEGATIVE FINDING The inspector found that the procedures lacked detail for ensuring representativeness of samples taken from the tanks for uranium concentration. Such samples were being used to verify accuracy of the gamma monitors and to serve as backup uranium concentration monitoring in case of failure of the in-line gamma monitors or their power supplies. The inspector was informed by the licensee that the proper technique involved draining two to four liters of solution from the sample line prior to taking the sample. Although the procedures mentioned disposal of drained liquids, no guidance was given in the procedures as to the proper amount of liquid to be drained from a sample line prior to taking the sample in order to ensure representative results. The licensee's actions concerning providing additional detail in the procedures for sampling the UN bulk storage tanks will be tracked as IFI 99-06-02. Cause: PROCEDURES NOT COMPLETE OR ACCURATE 12/03/1999
    - Administrative controls identified in the Criticality Safety Evaluation were not always implemented through the use of operating procedures. IR 99-01
      - + Issue Type: NEGATIVE FINDING The inspectors observed that the primary administrative controls were not always found in the operating procedures referenced on the fault trees. The most notable example of this was the administrative control for operators detecting accumulations of water in powder processing equipment. Although the inspectors found that operators were trained to recognize hazardous accumulations of water in powder processing areas, there were no instructions in the operating procedures to implement this administrative control. Also, the inspector found that the licensee's administrative procedure CA-200, "Management Control of Safety Significant Structures, Systems and Components," stated that all safety related controls were listed in appropriate area operating procedures. The licensee agreed that all safety related controls should be included in procedures and would ensure that such controls were identified in future procedure revisions. Cause: PROCEDURES NOT COMPLETE OR ACCURATE INADEQUATE COORDINATION BETWEEN ORGANIZATIONAL UNITS 02/05/1999

- Design of engineered safety features

- An event occurred when a level probe failed to function in a powder hopper. IR 99-04

- + Issue Type: DESIGN ISSUES The inspectors reviewed the licensee's actions in response to an incident concerning an accumulation of uranium in a roll compactor feed hopper (Nuclear Material Event Database item No. 990610). The incident occurred when a level controller in a powder feed hopper failed to detect the presence of uranium above the process control level. Normally, powder addition to the feed hopper was automatically stopped when the level control probe sensed powder. However, due to a broken electrical connection to the probe, the controller did not detect the accumulation of powder and continued to add powder to the feed hopper. The area operator observed that powder was not flowing out of the system and investigated the problem. The operator found the accumulation of material above the normal fill level in the feed hopper and shut down the system so that no more powder could be added to the feed hopper. Since the feed hopper was previously analyzed to be non-favorable geometry (NFG), the functioning of the level control system was important to safety. The area supervisor instructed the operator to process the accumulated uranium into favorable geometry containers. Subsequent licensee investigations determined that the amount of mass that had accumulated in the NFG portion of the feed hopper was within safety limits. However, only the attentiveness of the operator prevented the amount of powder from exceeding these limits. In order to strengthen the safety controls for this system, the licensee initiated several corrective actions. The level probes were replaced with a self-checking variety so that system failures could be detected and automatically stop the addition of powder to the feed hopper. Improvements were also made in the procedure for performing operator equipment inspections and adjustments were made to material tracking process controls to help better detect the accumulation of uranium powder in the feed hopper system. Longer term corrective actions included potential redesign of the feed hopper so that it was favorable geometry. Cause: RANDOM EQUIPMENT FAILURE IMPROPER EQUIPMENT DESIGN OR SELECTION 08/05/1999

- An overflow slot in a bulk powder feed system would not perform as stated. IR 99-203

- + Issue Type: NEGATIVE FINDING From IR 99-01 : "The inspectors questioned the ability of one of the Passive Engineered Controls (PECs) to perform its intended function. The PEC in question was a slot cut into the containment system for collection of spilled uranium powder from the pelleting feed system. The slot was one of six controls identified in the CSE for protecting against the accumulation of water (for assuring moderation control) in the powder collection system. The observed slot was only about 1/16 inch wide and partially plugged with powder. The inspectors observed that the slot's ability to drain water from the system would be negated by the presence of an accumulation of powder. In effect, the failure of any mass control that limited the accumulation of powder in the collection system also caused the failure of the moisture drainage slots. Thus, the inspectors found that a common cause failure mode existed between the moisture drainage slots and each of the mass controls on the system. The inspectors observed that this common failure mode was not discussed in the CSE as were other common failure scenarios. The inspectors discussed the potential ineffectiveness of the slots with the licensee. The licensee's criticality safety staff indicated that the situation would be reviewed for potential modification. The inspectors concluded that other sufficient controls were in place to assure double contingency protection. Since this issue potentially deals with the adequacy of the CSE, it has been referred to the NRC Fuel Cycle Operations Branch and tracked as Inspector Follow-up Item (IFI) 99-01-01." From IR 99-203 : "During inspection 70-1151/99-01, Region II inspectors noted a slot at the top of the bulk powder handling enclosure feed chute. The slot was determined to be safety significant in that it is intended to prevent the accumulation of water in the chute. The regional inspector observed that wet powder would most likely not go through the slot which was already partially blocked with powder. The inspectors noted that this safety feature (the slot) would only function as intended if water alone was present. The water would not flow through the slot as intended if powder was present in the chute. The licensee stated that two controls remain on the chute even if the slot fails because there is a level probe on the chute which will detect water level and moderator is prevented from entering the chute by barriers and moisture sampling of material up stream. The inspectors determined that the slot will not behave entirely in the fashion anticipated by the flowchart in the analysis although criticality safety of the equipment

4

is assured by the level probe and moderator controls. Licensee management agreed to modify the criticality safety analysis for the equipment to recognize that the overflow slot was not as effective a control as the level probe and moderator controls. Licensee action to revise the criticality safety analysis will be tracked as IFI 70-1151/99-203-02." Cause:  
**INADEQUATE AUDIT OR ASSESSMENT INCOMPLETE SAFETY BASIS 02/05/1999**

- Loss of double contingency protection under the pellet grinder bowl feeder resulted in an event. IR 98-09
  - + Issue Type: NON-CITED VIOLATIONS At 1030 on 8/19/98, while performing an enrichment cleanout at the grinder bowl feeder on pellet line #3, an unusual accumulation of pellets was noted in the favorable geometry poly pack (8 inch diameter x 7.5 inches high) and the chute above it. The pack is in a ventilated enclosure (approximately 14 inches x 14 inches x 14 inches) and is designed to collect any pellets that may fall from the bowl feeder. 56.8 kg of sintered, ceramic UO<sub>2</sub> pellets, enrichment 4.4 wt% U-235, were removed from the poly pack and chute. Double contingency protection for the collection of pellets under the bowl feeder consists of mass control (a maximum of 22 kg of UO<sub>2</sub> material accumulates in a favorable geometry) and moderator control (pellets remain dry). For this configuration, an appropriate, conservation limit for UO<sub>2</sub> mass is 41 lb (18.6 kg), which is the maximum permissible value for 5.0 wt% U-235, administrative mass limit of UO<sub>2</sub> pellets in an unfavorable geometry. The excessive material was immediately removed from line #3 to restore double contingency protection and all other operating pellet lines were inspected to verify no excessive material accumulation. Cause: **ERROR BY PERSON DUE TO INADEQUATE OR LACK OF TRAINING MANAGEMENT EXPECTATIONS NOT ENFORCED INADEQUATE EQUIPMENT DESIGN OR SELECTION 08/19/1998**
- Implementation of criticality safety evaluation procedures.
  - Criticality safety calculations were not being independently verified as required by the license. IR 98-203.
    - + Issue Type: NOTICE OF VIOLATION Cause: **PROCEDURES NOT COMPLETE OR ACCURATE MANAGEMENT EXPECTATIONS NOT ESTABLISHED** The inspectors reviewed the solvent extraction concentrator CSE which was a portion of the interaction analysis for the solvent extraction system. The concentrator was conservatively modeled as an infinite cylinder along with other components of the solvent extraction system. The inspectors noted that the concentrator calculations (a CALCNOTE) had not been independently verified. The licensee recognizes that this is a compliance problem and stated that all interaction analyses are planned to be upgraded from the solid angle method to keno within six months. The inspectors noted that the  $k_{eff}$  results determined by the unverified calculation were within the expected range for the geometry and material involved by comparison with accepted data in TID-7016 so that the issue has minor safety significance. The inspectors asked how many CALCNOTES were not verified and were informed by the licensee that 86 out of 205 were not verified. Of the unverified CALCNOTES, 13 are referenced in CSEs or CSAs. Of the 13 referenced and unverified CALCNOTES, 10 were done to validate handbook data. The licensee acknowledged that sensitivity studies and confirmatory type calculations of handbook values often did not get independent review, even when documented in CALCNOTES and referenced in CSEs and CSAs. The failure to perform an independent review of criticality safety calculations that support the solvent extraction CSE is Violation (VIO) 70-1151/98-203-04. 06/26/1998
  - A weakness was identified due to the failure to review portable HEPA filters. IR 99-203
    - + Issue Type: WEAKNESS See Record No. 146. Cause: **ERROR BY KNOWLEDGEABLE PERSON FOR UNKNOWN REASON INADEQUATE TASK PLANNING SAFETY BASIS NOT ESTABLISHED 04/23/1999**
    - + Issue Type: UNRESOLVED ITEM During a walkdown of plant process areas, the inspectors observed a portable HEPA filter unit parked in a maintenance work area of the facility. The portable HEPA consists of a small pre-filter and HEPA filter unit with a blower and six inch

diameter suction hose that is mounted on wheels for ease of movement. Facility staff acknowledged that the equipment was not analyzed for use in the plant and stated that operations was not allowed to use the equipment without special authorization from criticality safety. The inspectors noted that there was no sign or other indication that the equipment was not available for use. The equipment was being controlled through the radiation work permit (RWP) process whereby a user would submit an RWP which would be screened by operations to determine what safety or technical review was required for the particular application. A facility criticality safety engineer immediately placed a danger tag on the equipment to prevent use. In the early 1980's, the licensee purchased two portable HEPA filter units for the manufacturing automated process (MAP). When MAP was shutdown, the HEPAs became available for general use in the plant. The licensee indicated that the portable HEPAs are occasionally used for negative pressure ventilation such tent ventilation in low uranium contamination areas. The licensee indicated that the portable HEPAs were not used in areas where significant quantities of uranium were available and had not been reviewed by criticality safety. The licensee attempted to locate analysis for the portable HEPA filters (two are available) but could not locate any documentation other than the original MAP evaluation which mentioned that ventilation was approved. One of the two portable HEPAs has been approved for use in a non-uranium contaminated area of the Zion defabrication project. This does not pose a criticality safety concern. The other filter will remain out of service pending criticality safety evaluation. The licensee failure to evaluate the portable HEPA filter units prior to their use with fissile material violates license Section 6.2.5 which requires that, prior to use, a movable non-favorable geometry (NFG) container will undergo comprehensive analysis and have appropriate controls identified. The inspectors determined that immediate, effective licensee corrective action to remove the portable HEPA filter unit from service and initiate analysis was sufficient to assure continued safety of operations. The inspectors also determined that the safety significance of this issue would depend upon the results of the licensee analysis. The failure to analyze the portable HEPA filter units prior to use in the facility is Unresolved Item (URI) 70-1151/99-203-01. Cause: ERROR BY KNOWLEDGEABLE PERSON FOR UNKNOWN REASON INADEQUATE TASK PLANNING SAFETY BASIS NOT ESTABLISHED 04/23/1999

3. Projected Challenges to Performance in Nuclear Criticality Safety

- None

4. Recommended NRC Effort in Nuclear Criticality Safety

- Continue increased inspection effort of two criticality safety inspections per year. Focus on implementation of key criticality safety program elements.

C. **PLANT OPERATIONS (FFB/Rll/Ayres)**

1. Plant Operations Program Strengths

- None

2. Areas Needing Improvement in Plant Operations

- Understanding of safety control failure modes.
  - The potential effect of a level control system failure (at the bulk uranyl nitrate bulk storage tanks) could reduce the reliability of two identified safety controls. IR 99-06
  - + Issue Type: NEGATIVE FINDING The inspector found that when the tank level monitors indicated that the tank was empty (zero level), the solution recirculation system and the gamma monitor alarms were automatically disabled. The disabling of these systems was intended to protect the recirculation pumps from damage and to prevent spurious false alarms from the gamma monitors when a tank was empty. The inspector determined, through

6

interviews with the licensee's staff, that the tank level monitoring system could fail low and thus defeat these two safety controls. Such a failure could result from something as simple as a broken wire, as occurred on a powder level control system identified in a previous inspection (see inspection report 70-1151/99-04). The inspector found that the operators performed system overchecks twice per shift that could detect a problem with the level monitors. This would help prevent a long term loss of solution recirculation and/or increase of the uranium concentration. The licensee's actions concerning correcting potential problems associated with this failure mode will be tracked as inspector follow-up item (IFI) 99-06-01. Cause: **IMPROPER EQUIPMENT DESIGN OR SELECTION 12/03/1999**

- A uranium powder level control probe identified as a criticality safety control failed to function as designed when a broken wire disabled the probe (see NMED item #990610). The licensee's immediate actions in response to the roll compactor feed hopper process incident were adequate to keep it from becoming a safety significant event. The licensee's corrective actions were adequate in improving the reliability of the equipment and reducing the likelihood of similar material accumulations. IR 99-04 and NMED item #9906
- + Issue Type: DESIGN ISSUES The inspectors reviewed the licensee's actions in response to an incident concerning an accumulation of uranium in a roll compactor feed hopper (Nuclear Material Event Database item No. 990610). The incident occurred when a level controller in a powder feed hopper failed to detect the presence of uranium above the process control level. Normally, powder addition to the feed hopper was automatically stopped when the level control probe sensed powder. However, due to a broken electrical connection to the probe, the controller did not detect the accumulation of powder and continued to add powder to the feed hopper. The area operator observed that powder was not flowing out of the system and investigated the problem. The operator found the accumulation of material above the normal fill level in the feed hopper and shut down the system so that no more powder could be added to the feed hopper. Since the feed hopper was previously analyzed to be non-favorable geometry (NFG), the functioning of the level control system was important to safety. The area supervisor instructed the operator to process the accumulated uranium into favorable geometry containers. Subsequent licensee investigations determined that the amount of mass that had accumulated in the NFG portion of the feed hopper was within safety limits. However, only the attentiveness of the operator prevented the amount of powder from exceeding these limits. In order to strengthen the safety controls for this system, the licensee initiated several corrective actions. The level probes were replaced with a self-checking variety so that system failures could be detected and automatically stop the addition of powder to the feed hopper. Improvements were also made in the procedure for performing operator equipment inspections and adjustments were made to material tracking process controls to help better detect the accumulation of uranium powder in the feed hopper system. Longer term corrective actions included potential redesign of the feed hopper so that it was favorable geometry. Cause: **RANDOM EQUIPMENT FAILURE IMPROPER EQUIPMENT DESIGN OR SELECTION 08/05/1999**
- Electrical power to process line #5 was lost on 7/27/99 when a UF6 vaporization system condensate pump motor shorted due to exposure to steam. Since control of condensate is part of the criticality safety scheme for that area, these pumps are being redesigned and/or relocated in order to improve their reliability. One liners (7/29/99) and IR 99-04.
- + Issue Type: DESIGN ISSUES Cause: **EQUIPMENT FAILURE DUE TO ENVIRONMENTAL FACTORS (E.G., CHEM, THERM, MECHAN) 07/27/1999**
- The common failure mechanism of one passive engineered moderation control with the failure of mass controls on the bulk powder feed system was not documented in the CSE. The inspectors determined that an overflow slot, a criticality control for the pellet room powder feed operations, will not perform as stated. IR 99-01 and IR 99-203

- + Issue Type: NEGATIVE FINDING From IR 99-01 : "The inspectors questioned the ability of one of the Passive Engineered Controls (PECs) to perform its intended function. The PEC in question was a slot cut into the containment system for collection of spilled uranium powder from the pelleting feed system. The slot was one of six controls identified in the CSE for protecting against the accumulation of water (for assuring moderation control) in the powder collection system. The observed slot was only about 1/16 inch wide and partially plugged with powder. The inspectors observed that the slot's ability to drain water from the system would be negated by the presence of an accumulation of powder. In effect, the failure of any mass control that limited the accumulation of powder in the collection system also caused the failure of the moisture drainage slots. Thus, the inspectors found that a common cause failure mode existed between the moisture drainage slots and each of the mass controls on the system. The inspectors observed that this common failure mode was not discussed in the CSE as were other common failure scenarios. The inspectors discussed the potential ineffectiveness of the slots with the licensee. The licensee's criticality safety staff indicated that the situation would be reviewed for potential modification. The inspectors concluded that other sufficient controls were in place to assure double contingency protection. Since this issue potentially deals with the adequacy of the CSE, it has been referred to the NRC Fuel Cycle Operations Branch and tracked as Inspector Follow-up Item (IFI) 99-01-01." From IR 99-203 : "During inspection 70-1151/99-01, Region II inspectors noted a slot at the top of the bulk powder handling enclosure feed chute. The slot was determined to be safety significant in that it is intended to prevent the accumulation of water in the chute. The regional inspector observed that wet powder would most likely not go through the slot which was already partially blocked with powder. The inspectors noted that this safety feature (the slot) would only function as intended if water alone was present. The water would not flow through the slot as intended if powder was present in the chute. The licensee stated that two controls remain on the chute even if the slot fails because there is a level probe on the chute which will detect water level and moderator is prevented from entering the chute by barriers and moisture sampling of material up stream. The inspectors determined that the slot will not behave entirely in the fashion anticipated by the flowchart in the analysis although criticality safety of the equipment is assured by the level probe and moderator controls. Licensee management agreed to modify the criticality safety analysis for the equipment to recognize that the overflow slot was not as effective a control as the level probe and moderator controls. Licensee action to revise the criticality safety analysis will be tracked as IFI 70-1151/99-203-02." Cause:  
**INADEQUATE AUDIT OR ASSESSMENT INCOMPLETE SAFETY BASIS 02/05/1999**

### 3. Projected Challenges to Performance in Plant Operations

- Reliance on operator observations to detect failed safety controls during increased product throughput.
- Keeping the ISA as a "living" document.
- Developing consistency in event reporting.
- Implementation of safety controls identified by the ISA

### 4. Recommended NRC Effort in Plant Operations

- Maintain core inspection effort with emphasis on safety control failure modes.

## D. FIRE SAFETY (FFB/RII/Tobin & Lee)

### 1. Fire Safety Program Strengths

- Emergency backup utilities
  - The inspectors observed that plant emergency lighting along the path of egress significantly exceed the minimum illumination of 0.1 footcandle (i.e., illumination similar to that during a movie at a theater) required by industry standard. The emergency lighting capability exceeds the required minimum 1.5 hours and was maintained for a duration of two days throughout the plant. IR 99-02

### 2. Areas Needing Improvement in Fire Safety

- None

### 3. Projected Challenges to Performance in Fire Safety

- Continue enforcing the proper storage of combustible materials
  - Three issues identified in first half of LPR period concerning improper storage of combustible materials, one of which caused a fire. IR 99-01 and IR 99-02
    - + Issue Type: NEGATIVE FINDING The inspectors observed that the overall control of combustibles was adequately maintained for the activities performed during the plant shutdown. Egress routes were maintained clear of obstructions throughout the chemical and mechanical manufacturing areas. However, the inspectors identified two locations in the chemical manufacturing areas, where the accumulation of plastic type combustibles presented potential high fire loading concern. The conditions observed are described below: 1) Approximately sixteen, 55-gallon, empty, plastic drum liners were accumulated in a pile that was approximately 16-18 feet from UF6 cylinder staging area in the UF6 Bay. The UF6 Bay was protected by an automatic wet sprinkler system which minimized the potential risk for fire exposure to the UF6 cylinders. However, the accumulation of empty plastic drum liners presented significant fuel loading that could increase the fire severity in the UF6 Bay. 2) The inspectors observed a large pile of scrap computer equipment stored approximately 18-20 feet from dry ash powder storage racks and empty bulk material containers in the South-East Expansion area of the plant. This location was designated a moderation controlled area and automatic sprinkler system protection was not provided. The accumulation of plastic



combustibles presented increased fuel loading, and the observed condition was not consistent with requirements of plant procedure SYP-300, Housekeeping (i.e., minimize combustibles storage in moderation controlled areas). However, a sufficient separation distance existed between the pile of combustibles and dry ash powder storage racks and emptied powder storage containers. The lack of obvious ignition sources also minimized the potential of a fire exposure and reduced the overall risk significance of the conditions observed by the inspectors. The licensee acknowledged the concern for fire prevention and relocated the drum liners to a designated sprinkler protected storage location, away from the UF6 cylinders, prior to the NRC Exit Meeting. The licensee committed to relocating the pile of scrap computer equipment to a designated sprinkler protected storage location upon return of the full work force and to determining what additional actions were required to prevent future occurrences. The licensee indicated that the actions would be completed by April 30, 1999. The completion of these actions and the licensee's determination of additional required actions to prevent recurrence will be tracked as IFI 70-1151/99-02-02. Cause: MANAGEMENT EXPECTATIONS NOT ENFORCED 04/08/1999

- + Issue Type: NON-CITED VIOLATIONS Sparks from a plasma torch ignited combustible liquid stored in the URRS Decon Room (Cutting Room). The liquid was not detected during a check by the operator prior to performing the cutting. The fire was quickly extinguished with an ABC fire extinguisher. There was no damage to any container or equipment. There were no significant personnel exposures, elevated air samples, or releases to the environment. Cause: ERROR BY KNOWLEDGEABLE PERSON FOR UNKNOWN REASON INADEQUATE TASK CONTROL 01/12/1999

#### 4. Recommended NRC Effort in Fire Safety

- Maintain core inspection effort

### E. MANAGEMENT CONTROLS (FFB/Rll/Seymour)

#### 1. Management Controls Program Strengths

- None

#### 2. Areas Needing Improvement in Management Controls

- None

#### 3. Projected Challenges to Performance in Management Controls

- Eliminate discrepancies between administrative procedures and license requirements
  - Discrepancies between licensee administrative procedures and license requirements concerning liquid effluent criteria were identified. IR 99-01
  - + Issue Type: NEGATIVE FINDING The inspector reviewed the licensee's procedures for implementation of the liquid effluents monitoring program. The inspector noted that several discrepancies existed between the procedures and the license requirements as to effluent limit concentrations. Procedure COP-811601, "On-Line Gamma Activity Monitors and Quarantine Tanks System Operation," stated that a limit of 24 parts per million (ppm) uranium (U) was used as guidance for suspension of discharges to the water treatment facility (WTF) from the main chemical processing areas. The limit of 24 ppm U ( $5.5\text{E-}5 \mu\text{Ci/ml}$  based on four percent U-235 content) exceeded the criteria of  $3.0\text{E-}5 \mu\text{Ci/ml}$  as stated in license SNM-1107. In addition, procedure RA-401, "Environmental Control Requirements Mandated By 10 CFR20 and NRC License SNM-1107," stated that a setpoint of  $3.6\text{E-}5 \mu\text{Ci/ml}$  for the online gamma

10

spectroscopy system was used to automatically divert flow from the WTF to diversion tanks. In discussions with personnel, the inspector determined that these procedural discrepancies were not significant issues due to the resulting low offsite dose levels (i.e. <0.002 millirem/year) associated with the procedural limits. The inspector also noted that procedure COP-830509, "Release of F-1165 Effluent for Processing," specified that discharges from the WTF should be less than 0.2 ppm U which exceeds the license criteria of 0.05 ppm U. The inspector discussed this with the licensee who indicated that the license requirement of 0.05 ppm U was a typographical error, and should have been 0.5 ppm U. Again, this discrepancy was not viewed as being safety significant due to the low offsite public exposures as a result of the licensee's radiological liquid effluents. However, the inconsistencies between the limits in the operating procedures and license requirements will be resolved by the licensee through modification of procedures and/or license amendment. The correction of these items will be tracked as an IFI (IFI 99-01-04). Cause: PROCEDURES NOT COMPLETE OR ACCURATE 02/05/1999

- Improve documentation of independent emergency preparedness audit
  - An independent emergency preparedness audit lacked details to demonstrate that the program assessment included procedures, training, equipment, and drills/exercise observations. IR 98-07
  - + Issue Type: NEGATIVE FINDING Documentation for the annual independent audit was reviewed and an interview was conducted with the auditor to determine the adequacy of the audit in meeting Section 7.8 of the SEP. Based on the documentation, the inspector determined that the audit was a very detailed review of the SEP to determine if the SEP was consistent with guidance in Regulatory Guide (RG) 3.67 (Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities) and requirements in 10 CFR 70.22. However, the audit documentation lacked details to show critical program elements such as emergency response training, facilities, equipment, or offsite support agency interface were reviewed. Thus, the inspector questioned the auditor regarding what additional aspects of the program were reviewed. The interviewee indicated that although the primary focus of the audit was the SEP, the audit also included observation of the biennial exercise, a check of the emergency vehicle and supplies, training records, and surveillance records for emergency equipment and supplies were reviewed. The interviewee acknowledged that the documentation to support such areas audited was lacking from the report. Based on the interview and audit documentation, the inspector emphasized the importance of the development and implementation of an audit plan and checklist to ensure the audit was performed in a manner consistent with the SEP requirement. This aspect of the audit program was previously discussed in an NRC Inspection Report (70-1151/97-05). The auditor's current position involved emergency planning and the development of Plans and procedures for the Emergency Management Team at the Westinghouse Energy Systems Business Unit (ESBU) site. Audit findings requiring corrective actions were assigned in the licensee's commitment tracking system (CTS) for followup. Cause: INADEQUATE AUDIT OR ASSESSMENT 09/25/1998
- Improve corrective actions and timeliness of corrective actions
  - Several deficiencies were identified with the licensee's efforts to implement corrective actions identified in IR 97-205. IR 98-202
  - + Issue Type: NEGATIVE FINDING Incorporation of License Application Section 6.0 requirements were flawed and incomplete. Licensee technical staff apparently did not fully understand the commitments made at the pre-enforcement conference and had planned to include the technical requirements for criticality safety as part of longer term corrective actions. The inspectors believe these findings are the lingering results of the management deficiencies identified by IR 97-205 and acknowledged by the licensee at the enforcement conference, in that, management systems to ensure that corrective actions were adequately implemented were still immature. Cause: MANAGEMENT EXPECTATIONS NOT COMMUNICATED OR UNDERSTOOD 05/01/1998
  - Weaknesses were identified in the licensee's implementation of its Safety Margin

#### Improvement Program (SMIP). IR 97-202

- + Issue Type: **NEGATIVE FINDING** The weaknesses included: 1) lack of ownership for review and closure of self-identified weaknesses, 2) weak interim measures for identification and control of NCS controls and safety-related devices, 3) weak management oversight and control measures to ensure full integration of SMIP initiatives, completion of SMIP items, and resource allocation management to ensure successful completion of committed tasks at an acceptable quality level. Cause: **MANAGEMENT EXPECTATIONS NOT ENFORCED** 05/01/1998

#### - Corrective actions were untimely. IR 98-05

- + Issue Type: **NEGATIVE FINDING** Open items from audits were tracked and adequately trended. However, the timeliness of resolution appears to require management attention as evidenced by items remaining open for more than two years. Examples were as follows: The development of a Health Physics Technician training package was assigned on January 19, 1995, but corrective actions closure was not until March 9, 1998. Actions to revise and update the respirator training video tape was assigned on April 28, 1995, and remained open as of July 98. Cause: **INADEQUATE CORRECTION OF IDENTIFIED PROBLEMS** **MANAGEMENT EXPECTATIONS NOT ENFORCED** 07/31/1998

#### - Employees failed to follow procedures associated with the issuance, storage, and collection of TLDs. IR 98-05

- + Issue Type: **NEGATIVE FINDING** The inspector noted during the review of documentation (TLD log book, TLD summary report) additional procedural non-compliances associated with the issuance, collection, and return of TLD badges during CY 1997 and continued during the second quarter of CY 1998. Many of the non-compliances were also previously identified during an internal audit by the licensee. In response to previous findings, the licensee's corrective actions were effective in reducing the number of missing badges or badges that were not returned for processing. During facility tours, the inspector found no examples where personnel failed to wear TLDs while working in an area with the potential for exposure to radiation. In response to the procedural non-compliances involving the issuance, proper storage, and failure to report lost or misplaced TLDs, the licensee discussed the following items as possible corrective actions to prevent similar or recurring non-conformance: review and revise the procedure governing the issuance of TLDs to incorporate information recording and retention requirements; all Regulatory Engineering and Operations (REO) personnel be required to perform a detailed review of assigned procedures specific to assigned tasks to ensure procedural adherence; REO personnel be periodically tested on procedure requirements for assigned tasks; increase the audit frequency of badge storage areas; and disciplinary actions where warranted for repeat procedure violations. The inspector indicated that the corrective actions to resolve the procedural non-compliances associated with TLD issuance, collection, and storage will be tracked as an Inspector Followup Item (IFI) (IFI 98-05-01). Cause: **MANAGEMENT EXPECTATIONS NOT ENFORCED** 07/31/1998

#### 4. Recommended NRC Effort in Management Controls

12

II. SAFEGUARDS

*2 pages withheld  
in entirety*

### III. RADIOLOGICAL CONTROLS

#### A. RADIATION PROTECTION (FFB/RII/Gooden)

##### 1. Radiation Protection Program Strengths

- None

##### 2. Areas Needing Improvement in Radiation Protection Program

- None

##### 3. Projected Challenges to Performance in Radiation Protection Program

- Reducing occupational exposures during increased workload and material throughput.
  - With two exceptions (extremity and collective dose), CY 98 exposures were reduced approximately seven to eight percent when compared to CY 97 data (IR 99-03). Also, the maximum TEDE had shown a decrease each year from CY 96 to CY 98. However, data for CY 99 collected through October that collective dose already exceeded the CY 98 total and showed a projected increase in maximum TEDE back to near the CY 97 level.

##### 4. Recommended NRC Effort in Radiation Protection Program

- Maintain core inspection effort

#### B. ENVIRONMENTAL PROTECTION (FFB/RII/Swatzell)

##### 1. Environmental Protection Program Strengths

- None

##### 2. Areas Needing Improvement in Environmental Protection Program

- None

##### 3. Projected Challenges to Performance in Environmental Protection Program

- None

##### 4. Recommended NRC Effort in Environmental Protection Program Area

- Maintain core effort

15

**C. Waste Management (FFB/RII/Swatzell)****1. Waste Management Program Strengths**

- None

**2. Areas Needing Improvement in Waste Management Program**

- None

**3. Projected Challenges to Performance in Waste Management Program**

- None

**4. Recommended NRC Effort in Waste Management Program Area**

- Maintain core effort

**D. Transportation (FFB/RII/Ayres)****1. Transportation Program Strengths**

- None

**2. Areas Needing Improvement in the Transportation Program**

- Adherence to Certificate of Compliance requirements
  - New fuel assembly designs shipped in MCC-4 shipping containers without proper authorization per the CoC. IR 99-06 and 30-day reports dated 8/17/99 and 3/9/99
  - + Issue Type: NON-CITED VIOLATIONS The inspector reviewed three 30-day reports issued by the licensee concerning self-identified violations of the Certificate of Compliance (CoC) requirements for fuel assembly shipping containers. The first of these reports was issued on March 9, 1999, and identified that certain fuel assemblies had been shipped between February 11 and 17, 1999, with redesigned guide tube dimensions that were not within the specifications authorized by the CoC. The licensee's corrective actions included revising the CoC to include the redesigned guide tube dimensions and to perform a root cause investigation to identify any additional corrective actions needed. The revised CoC was approved by NRC on February 22, 1999. The inspector was briefed on the licensee's root cause investigation, which revealed that the licensee's Engineering Change Notice (ECN) system had allowed changes to be made to fuel assembly designs without a review of the safety impact that such changes would have on the fuel assembly shipping containers. The licensee modified its ECN procedure (effective July 30, 1999) to ensure that certain fuel assembly design changes would be reviewed by the appropriate personnel to determine the potential safety impact associated with the fuel assembly shipping containers. The inspector found that this procedural change would likely prevent recurrence of the violation. This non-repetitive, licensee-identified and corrected violation is being treated as a non-cited violation (NCV), consistent with Section VII.B.1 of the NRC Enforcement Policy, and is identified as NCV 99-06-03. While performing the root cause investigation, the licensee identified that certain fuel assemblies had been shipped in March 1999 with modified annular pellet blanket configurations that were not within the specifications authorized by the CoC. A 30-day report was issued to the NRC on August 17, 1999, to document the violation. The licensee's corrective actions included revising the CoC and completing the corrective actions identified by root cause investigation performed from the previous violation of the CoC. The

16

CoC was quickly revised and approved by NRC on August 16, 1999. The inspector found that this incident had the same root causes as the previous incident, but occurred before corrective actions could be implemented. Thus, this violation was a second example of NCV 99-06-03. Cause: INADEQUATE COORDINATION BETWEEN ORGANIZATIONAL UNITS 12/03/1999

- Several MCC-3 shipping containers were constructed and used with a weld pattern different than that specified in the drawings reference by the CoC. 30 day report dated 11/23/99.
- + Issue Type: UNRESOLVED ITEM The inspector reviewed the 30-day report dated November 23, 1999, that identified several MCC-3 shipping containers were constructed with a weld pattern different than that specified in the drawings referenced by the CoC. The weld specifications were intended to strengthen the top half of the container shell to ensure container integrity during accident conditions. The licensee's corrective actions included placing an immediate hold on the use of the affected containers; re-welding the affected containers to bring them within specification; and inspection of all fuel assembly shipping containers to ensure compliance with all applicable license drawing requirements. At the time of this inspection, the effect of the different weld pattern on the structural integrity of the container had not been determined. Until such a determination can be made, this situation remains an unresolved item (URI) and is identified as URI 99-06-04. Cause: INADEQUATE AUDIT OR ASSESSMENT INADEQUATE CONSTRUCTION 10/25/1999
- Failure to perform required periodic (five-year) re-inspections of the gadolinium absorber plates on five shipping containers. 30-day report to NMSS dated 9/11/98 and IR 98-10.
- + Issue Type: NEGATIVE FINDING On August 13, 1998, it was determined that five model MCC shipping containers had been used for fuel shipments which had not received a periodic (every five years) detailed re-inspection within the allotted time, as required by Shipping Container Certificate of Compliance USA/9239/AF. The Certificate requires that, every five years, each shipping container be subjected to a detailed re-inspection, including verification of the existing configuration to drawing requirements, and a detailed inspection of the gadolinium absorber plates. All inspections had been performed except for the gadolinium absorber plates. Shipments were made with these five containers with the re-inspections one to ten months overdue. The licensee explained that the violation occurred because 1) QC inspection failed to perform the detailed gadolinium inspection and issue new verification forms, and 2) Manufacturing operating procedures do not require a QC inspection for containers sent out empty. Cause: ERROR BY PERSON DUE TO INADEQUATE OR LACK OF TRAINING PROCEDURES NOT COMPLETE OR ACCURATE INADEQUATE COORDINATION BETWEEN ORGANIZATIONAL UNITS INADEQUATE TASK CONTROL 8/13/99

### 3. Projected Challenges to Performance in Transportation Program

- None

### 4. Recommended NRC Effort in Transportation Program Area

- Maintain core inspection effort with emphasis on CoC compliance.

## IV. FACILITY SUPPORT

### A. MAINTENANCE AND SURVEILLANCE (FFB/RII/Ayres)

1. Maintenance & Surveillance Program Strengths

- None

2. Areas Needing Improvement in the Maintenance & Surveillance Program

- None

3. Projected Challenges to Performance in the Maintenance & Surveillance Program

- Continued improvement in the implementation of the preventive maintenance program.
  - There was no preventive maintenance backlog associated with ISA controls. IR 99-201
  - + Issue Type: POSITIVE FINDING The licensee currently had implemented MAPCON, a computerized maintenance tracking system. The system covered maintenance for the entire facility which was inclusive of the Conversion, Solvent Extraction, Hot Oil System, Pelleting, and Uranium Recovery. The MAPCON system maintains maintenance records, and functionality verification forms for the various areas. The UN Bulk Storage Tanks ISA listed three activity monitors as active engineered controls (AECs) and six gamma monitors and data cards as administrative controls with computer or alarm assist (ACs). Review of the maintenance records indicated that all AECs and ACs had received periodic functional testing. The emergency diesel generator was listed as the only AEC for the chemical receipt/handling/storage. The maintenance record for the emergency diesel was also current and up to date. Any deficiencies were promptly reported and corrected. To ensure the integrity of the UN storage tanks, the licensee conducted visual tank inspections at a semiannual basis. Review of maintenance data indicated that the tank inspections were current. The UN tanks were equipped with rupture disks to release the solution in case of an emergency. The rupture disks were destructively tested and replaced with a new assembly every 2 years. Based on the rupture disk assembly design and the up-to-date maintenance history, the inspectors concluded that the rupture disk assembly was likely to function properly when activated. The preventative maintenance (PM) for the anhydrous ammonia system was also reviewed. The ammonia system is currently on a preventative maintenance schedule of having the pressure relief valves replaced every 5 years, and ultrasonic testing of the storage tanks every 3 years by an outside vendor. The licensee was current with both schedules. Regarding the issue of a maintenance backlog, there was no backlog of any maintenance items (safety significant or otherwise) at the time of inspection. Furthermore, the licensee indicated that the status of all the maintenance items was reviewed weekly by the maintenance department to prevent the accumulation of overdue maintenance items. 07/02/1999

4. Recommended NRC Effort in the Maintenance & Surveillance Program

- Maintain core inspection effort



**B. TRAINING (FFB/Rll/Seymour)****1. Training Program Strengths**

- Emergency preparedness and fire response training
  - Non-required table-top drills provided an enhancement to emergency response training program. IR 98-07
    - + Issue Type: POSITIVE FINDING the licensee implemented a program of non-required quarterly table-top drills to maintain the proficiency of ERO personnel. During an interview with the Site Emergency Director, the inspector was informed that the table-top scenarios and walkthroughs had provided good training and a better understanding of the various roles.  
09/25/1998
  - Fire Brigade training at the State Fire Academy was also identified as a Strength because of the realist exercises of fire-and-rescue, multi-story fire fighting, and fire ground tactical operations using "burn buildings". Additionally, members of the Columbia Fire Department also provide site-specific "Haz Mat" training to each shifts Brigade. IR 99-02

**2. Areas Needing Improvement in the Training Program**

- None

**3. Projected Challenges to Performance in the Training Program**

- None

**4. Recommended NRC Effort in the Training Program**

- Maintain core inspection effort

**C. EMERGENCY PREPAREDNESS (FFB/RII/Gooden).****1. Emergency Preparedness Program Strengths**

- None

**2. Areas Needing Improvement in the Emergency Preparedness Program**

- None

**3. Projected Challenges to Performance in the Emergency Preparedness Program**

- Continued timely activation and staffing of the Emergency Control Center.
  - The inspector noted that since the last inspection, only one drill was conducted, but the results appeared to reflect an improvement to the licensee's administrative system for ensuring timely activation and staffing (IR 99-03).

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**4. Recommended NRC Effort in the Emergency Preparedness Program**

- Maintain core inspection effort

## V. SPECIAL TOPICS (LICENSING ACTIVITIES)

### A. SAFETY LICENSING (LIB/FCSS)

#### 1. Licensing Program Strengths

- The licensee continues to provide updated License Annexes (i.e., ISA Summaries) within 30 days for substantial changes and on a semiannual basis for non-substantial changes. The commitment to provide substantial changes to the NRC within 30 days by the licensee provides NRC with appropriate information on a timely basis.
  - Basis: The semiannual update of non-substantial changes to License Annexes is voluntary and it shows a very good practice, constant effort, and proactive approach from the licensee. Other licensees provide changes to ISA summary type information on a bi-annual basis or only when there are changes.
- Communications with the licensee has improved which allows NRC to be aware of upcoming issues.
  - Basis: Regular communication between the licensee and NRC is being used to keep each other aware of schedules and other items of interest.

#### 2. Areas Needing Improvement in the Licensing Program

- Sometimes, the licensee fails to provide proper submittals in a timely fashion.
  - Basis: After a Spring 1999 meeting, changes to the License Application were to be sent to the NRC in a timely manner, however the changes were not sent until Autumn 1999. Sometimes, the licensee forgets to mark the changes in the submittal or submits a change and, before the review is complete, the licensee provides changes to the changes which means that additional staff review time would be needed. In addition, in the case of a response to a request for additional information, the licensee failed to provide changes to the License Application and instead provided reasons why it was not necessary to make the changes. This has caused a recent submittal to reviewed as a completely new submittal rather than minor changes to a previous submittal which also means that additional staff review time will be needed.

#### 3. Projected Challenges to Performance in the Licensing Program

- None

### B. FNMC Plan (FCLB/DFCSS)

#### 1. FNMC Plan Strengths

- The licensee continues to provide an updated and revised FNMC Plan on a semiannual basis. The Plan contains adequate practices and commitments to fulfill its MC&A program and regulatory requirements.

- Basis: The semiannual submittal of FNMC Plan revision is voluntary and it shows a very good practice, constant effort, and proactive approach from licensee staff in this area. Other licensees only do it on a needed basis. It is considered one of the best FNMC Plans among all facilities.

2. Areas Needing Improvement for the FNMC Plan

- None

3. Projected Challenges to Performance for the FNMC Plan

- None