R2/E1

Plant Operations Issues

- Methods for Preventing Failure of Operating Equipment That Cause Degradation of Radiological and Criticality Safety Controls

Equipment Failures - 195/210/211, 260, 336

195 On February 7, 2000, a spill of uranyl nitrate solution occurred in the UF6 bay near the HF Spiking Station. The solution seeped through a wall around piping penetrations and onto an outdoor concrete pad. Initial surveys of the pad showed contamination levels below reportable limits. However, a layer of soil was removed from the top of the pad during the cleanup operation, and subsequent surveys on 2/25/00 revealed a more significant amount of contamination in the concrete. Contamination levels averaged 133 dpm/100 cm2 alpha removable and 6,000 dpm/100 cm2 fixed alpha in the concrete. The licensee determined that the fixed contamination was reportable per 10 CFR 70.50(b)(1). *EN #36727 & IR 00-02*

210 The uranyl nitrate piping system was not adequately being maintained per the plant configuration control program and was identified as Violation (VIO) 00-02-02. *IR 00-02*

** NOTICE OF VIOLATION The inspector reviewed the licensee's procedure for configuration control in the manufacturing plant. The inspector observed various areas of the licensee's uranyl nitrate piping system, including the area involved in a recent contamination event (see Section 2.c). The licensee indicated that the contamination event was due to the failure of a piece of threaded pipe on a uranyl nitrate sample port. The inspector reviewed the drawing referenced by the system's Integrated Safety Assessment (ISA) and noted that the drawing was last updated in April 1998. The drawing indicated a piping specification of welded construction, with the provision that threaded connections could be used when adequate work space was not available for welding, or when adapting to threaded instrumentation or equipment. Neither of these provisions applied to the failed piping that led to the contamination event. The inspector also found that drawing included a piping manifold with six valves that had been removed from the manufacturing area without being reviewed and approved through the configuration control program. Although the removed valves were no longer being used, this rendered the process information referenced by the ISA inaccurate. The inspector also observed the uranyl nitrate piping in several other areas of the plant and found places where threaded fittings had been used instead of the specified welded fittings. All of these findings are examples of failure to maintain safety-related operations per the plant configuration management program and are identified as Violation (VIO) 00-02-02.

260 The Incinerator Ash Screening Hood was in poor condition and susceptible to producing airborne activity problems. *IR 00-06*

** NEGATIVE FINDING The inspector observed that the Incinerator Ash Screening Hood was in poor condition, with its plexiglas window being held in place with duct tape. A note had been taped to the hood warning operators to keep the box clean because of past problems with airborne activity associated with that station. Although the airborne activity had recently been lowered due to improvements in ventilation, the licensee's management examined the hood, agreed that repairs were needed to the station, and initiated corrective action. 11/17/2000

292 Several safety controls associated with the ADU conversion process were found to be incapable of performing their intended function upon fault conditions from the programmable logic controllers. *EN # 38020*

** LICENSEE EVENT REPORTS At approximately 0759 the decanter tripped off line on conversion[ ] Subsequently line[ ]was shutdown at 0805. An error in the display program was initially suspected. With conversion[ ] shut down, instrument technicians were called. The technicians attempted to correct the problem with the display program to no avail. An instrumentation and controls (I/C) engineer was called and tracked the problem to the[ ]PLC. Since it was determined that the PLC processor for[ ]had faulted, the processor was reset and tested. The test was satisfactory.

Ex 4

Line[ ]was restarted at approximately 1000. At approximately 1030 line[ ]was shut down due to a plugged[ ]valve[ ] During this shutdown, a process engineer was informed about the earlier events. The process engineer became concerned about the status of the safety significant controls[ ]and contacted a nuclear criticality safety (NCS) engineer at approximately 1130. The NCS engineer was present in the control room at approximately 1140. A time-line of events was reconstructed. The NCS engineer reviewed the sequence of events with the I/C engineer. It was

M-1

determined that an output fault in an I/O card caused the processor to go into fault mode but all outputs did not go to their correct (OFF) state.

The NCS engineer determined that in the time period from 0759 until line [ ] was secured at approximately 0805, the active engineered safety significant controls (SSCs) [ ] were unavailable, and less than double contingency protection existed in the vaporization system during that time period. The SSCs are considered to have been in place for the 1000 startup and remained in place until the shutdown at 1030, although the cause of the initial failure had not been determined. Conversion operators [ ] were instructed by the NCS engineer to not restart [ ] until the cause of the PLC failure was determined and corrected. [ ] remains shutdown pending further investigation.

Ex 4

Justification for Continuing Operations [ ]

Line [ ] utilizes a unique Numalogic PLC system while Lines [ ] utilize a different programmable logic system. There is no reason to believe the Numalogic error is possible on the other lines. The manufacturer of the other programmable logic system [ ] was contacted and stated that their cards cannot fail into any state other than all OFF. Conversion Lines [ ] remain in operation.

Double Contingency Protection

Ex 4 [ ]

It was determined that less than double contingency protection remain for these systems and greater than a safe mass was involved. In accordance with Westinghouse Operating License (SNM-1107), paragraph 37.3 (c.5), this event meets the criteria for a 24 hour notification because it constitutes a "nuclear criticality safety incident, in an analyzed system, for which less than previously documented double contingency protection remains . . and: greater than a safe mass is involved, but a sufficient number of the controls that were lost are restored within four (4) hours such that double contingency protection is restored."

As Found Condition

See "Reason for Notification" above.

Summary of Activity

Ex 4

An unknown PLC failure led to the shutdown of conversion line [ ] It was determined that less than double contingency protection existed [ ] from 0759 to 0805. Therefore, the NCS engineer directed that line [ ] could not be restarted until the cause of the failure was determined and corrected.

Conclusions

Loss of double contingency protection occurred. At no time was there any risk to the health or safety of any employee or member of the public. No exposure to hazardous material was involved. This notification is the result of equipment failure, not a deficient NCS analysis. 05/21/2001

293 Six apparent violations were identified as part of a Special Team Inspection to investigate the common mode failure of multiple criticality safety controls in the ADU process lines due to errors in the configuration of a system of programmable logic controllers. This inspection was a follow-up to PIM item #292. *IR 01-202 & PIM Item #292*

** ESCALATED ENFORCEMENT ISSUE The team's findings are summarized as follows:

- Licensee operators initial response to the event involving manually shutting down ADU Conversion Line [ ] was adequate.

Ex 4

- An apparent violation was identified due to licensee action to restart ADU Conversion Line [ ] without identifying and correcting the underlying deficiency.

- An apparent violation was identified due to inadequate license criticality safety review of the criticality safety controls

for the ADU Conversion lines including the failure to review possible common modes associated with Programmable Logic Controllers (PLCs).

Ex 4

- A apparent violation was identified due to the complete loss of credited criticality safety controls against a credible criticality accident scenario on ADU Conversion Line [ ]

- An apparent violation was identified due to the failure of the licensee functional verification program to identify and correct weaknesses associated with PLCs in the ADU Conversion lines.

- A training program weakness was identified due to the failure of multiple licensee employees to recognize the failure of multiple criticality safety controls during an operational upset.

- Licensee immediate corrective actions to assure safety of the ADU Conversion lines subsequent to their restart were adequate.

- An apparent violation was identified due to the failure of licensee operators and technicians to immediately report a safety significant event involving a process upset to licensee Regulatory Affairs during the initial response to an operational event.

- An apparent violation was identified due to the licensee Failure to report to the NRC within four hours an event involving an unanalyzed or unanticipated criticality safety incident for which the severity and remedy were not readily determined. 05/30/2001

Ex 4

336 A [ ] spill of uranyl nitrate solution occurred into a diked area at the HF spiking station on October 29th. Before area operators could clean up the spill, it had seeped through a hole in the dike down into the concrete subflooring. The licensee plans to repair the dike and continue using the spiking station until an alternate spiking station can be brought on line at the end of November. The licensee will then remediate the concrete subflooring and any contaminated soil below it.
One liners for 11/1/01

Configuration Control - 210, 261, 295

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210 The uranyl nitrate piping system was not adequately being maintained per the plant configuration control program and was identified as Violation (VIO) 00-02-02. *IR 00-02*

** NOTICE OF VIOLATION The inspector reviewed the licensee's procedure for configuration control in the manufacturing plant. The inspector observed various areas of the licensee's uranyl nitrate piping system, including the area involved in a recent contamination event (see Section 2.c). The licensee indicated that the contamination event was due to the failure of a piece of threaded pipe on a uranyl nitrate sample port. The inspector reviewed the drawing referenced by the system's Integrated Safety Assessment (ISA) and noted that the drawing was last updated in April 1998. The drawing indicated a piping specification of welded construction, with the provision that threaded connections could be used when adequate work space was not available for welding, or when adapting to threaded instrumentation or equipment. Neither of these provisions applied to the failed piping that led to the contamination event. The inspector also found that drawing included a piping manifold with six valves that had been removed from the manufacturing area without being reviewed and approved through the configuration control program. Although the removed valves were no longer being used, this rendered the process information referenced by the ISA inaccurate. The inspector also observed the uranyl nitrate piping in several other areas of the plant and found places where threaded fittings had been used instead of the specified welded fittings. All of these findings are examples of failure to maintain safety-related operations per the plant configuration management program and are identified as Violation (VIO) 00-02-02.

261 Delays in updating documentation after process modifications was a weakness in the licensee's configuration management system. *IR 00-06*

** WEAKNESS The inspector reviewed several selected files for facility change requests, focusing on projects that involved significant process changes to chemical area process equipment. The inspector noted that appropriate approvals were being obtained for process changes and that records were being adequately kept. The inspector observed that there was considerable variation in the way the change request forms were being filled out. The inspector found that specific documents needing to be updated as a result of the proposed changes were not always listed on the Change Control Form as specified on the form. Other times, certain selections on the form would indicate the initiator to check "yes" or "no", but would be left blank. The inspector also reviewed the close-out of projects that had been authorized for start-up and operation. The inspector found that the actual updating of documentation (particularly as-built drawings) sometimes was delayed over a year after start-up of the changed equipment. The inspector observed that the licensee's configuration control procedure allowed for system start-up before completion of revised documentation and gave no time frame for completing documentation revisions. In the interim, marked-up or red-line drawings could be used for process documentation. The licensee indicated that drafting services were being expedited to reduce the backlog of as-built drawing revisions.

11/17/2000

295 The configuration control program showed weaknesses in the documentation and control of obsolete equipment connected to process piping, and in ensuring that process changes did not affect the safety bases of previously approved configuration changes. *IR 01-03*

** WEAKNESS The inspector reviewed plant drawings for the licensee's powder production and solvent extraction systems. The inspector observed that safety-related controls and process features depicted in the design drawings were in place and functional. Conversely, the inspector also noted that all safety-related equipment being used was included in the drawings. However, the inspector observed that certain pieces of old process equipment that were not included in the drawings were still in place on the process line but no longer being used. Much of this obsolete equipment (pumps, gauges, etc.) was still connected to the process piping system and isolated from the process with valves. Additionally, these isolation valves were not tagged out to identify them as not to be used. The inspector discussed potential problems associated with not maintaining or controlling obsolete equipment, including possible leaks of SNM into the work area due to the failure or inadvertent opening of the isolation valves. The licensee indicated that an effort to remove obsolete equipment had been started and would continue to work toward removing all obsoleted equipment.

The inspector reviewed the change control system files and found that changes to the process equipment were reviewed and approved in accordance with licensee's procedures and license requirements. The inspector observed that some proposed changes had been approved for up to three years but the actual implementation of the changes had been delayed. In the meantime, other changes had been requested, approved, and implemented to the same process area. This meant that the original configuration (under which the delayed change was approved) was no longer valid. The inspector found that the licensee's configuration control program did not have a method for ensuring that modifications to the plant made after approval but before implementation of a configuration change would not affect the safety basis upon which the delayed change was approved. The inspector considered this a weakness in the configuration control program that needed to be addressed by the licensee. The licensee acknowledged this as a potential problem and planned to revise the configuration control program accordingly.

Not Following Procedures/Postings - 227, 286, 279, 294

- Adherence to safety significant procedures and postings

227 A violation of Section 3.4.1 of the License Application occurred for the failure to conduct radioactive materials package unloading activities in accordance with the requirements of chemical operating procedure COP-836041. The licensee's root cause determination and corrective actions to prevent recurrence were acceptable. *IR 00-03*

** NOTICE OF VIOLATION On May 2, 2000, the inspector observed the licensee perform incoming receipt surveys of [ ] containing UNH crystals. The UNH crystals were received from the [ ] on May 1, 2000, at approximately 10:45 p.m. Upon receipt, the licensee performed both direct radiation surveys and surface contamination surveys of the transport trailer containing the [ ] of UNH crystals. The trailer was secured with a tamper safe seal which was not removed until May 2 at approximately 1:00 p.m. when the licensee began to perform individual surveys of the [ ] containing the UNH crystals. The inspector observed the licensee perform direct surveys for alpha and beta/gamma radiation and surveys for removable surface contamination of five drums in accordance with regulatory operations

Ex A

procedure ROP-02-008, Surveys of Incoming Shipment of Radioactive Materials, Rev. 7, dated March 2, 2000. The licensee used appropriate instrumentation and survey techniques. Sufficient smears and measurements were taken in the most appropriate locations to yield a representative assessment of the non-fixed contamination levels. From a review of the records, none of the receipt survey results indicated that the limits specified in 49 CFR 173.441 or 173.443 were exceeded.

On May 3, 2000, the inspector observed licensee operators perform the opening of the package and removal of the UNH crystals from the inner packaging. This process was controlled by chemical operating procedure COP-836041, Receipt of Uranium Scrap Shipments from Outside Sources, Rev. 1, dated February 22, 2000. The inspector noted that an operator did not follow step 8 of COP-836041, which required placing the pail of UNH crystals on a clean piece of paper inside the UNH crystal enclosure hood. The purpose of placing the material inside the hood was to reduce the potential airborne radioactivity concentrations in the work area and contamination control. Instead, the operator opened the pail on the floor outside of the UNH crystal enclosure hood, removed the opened plastic bag of UNH crystals, and then placed the opened plastic bag of UNH crystals in the enclosure. The inspector noted that the COP-836041 was not available at the job location. Upon discovery of the procedural violation, a licensee representative immediately notified the area supervisor who temporarily ceased operations until corrective actions could be implemented. During the licensee's review, it appeared that not all of the operators were aware of Step 8 requirements.

After a review of the problem, the licensee determined that the primary root cause was that the processing of incoming scrap material was not a continuous operation. The operation was performed as the material was received. The receipt of this material had been discontinued for several weeks due to the plant being shutdown for maintenance and inventory. Although the operator initially reviewed the chemical operating procedure, the operator did not review the procedure after the several weeks of not performing the operation. Part of the corrective action taken was counseling the operator about his actions and the necessity of following the procedures. In addition, all of the URRS operators were retrained on the procedure and on the importance of following all procedures. A secondary cause was the procedure had some sections which could be confusing. To prevent recurrence, the licensee had initiated the revision of COP-836041 so that the requirements for opening the packages were delineated in a clearer manner. All procedures are currently being revised by an outside professional procedure writing group. This procedure has been given a priority status for revision. The inspector determined that the information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence was adequately addressed. The inspector discussed the event with licensee representatives, and indicated that a violation of Section 3.4.1 of the License Application occurred (VIO: 70-1151/00-03-01: Failure to conduct radioactive materials package unloading activities in accordance with the requirements of COP-836041). 05/04/2000

286 A container of contaminated incinerator ash was improperly stored and posed a potential for airborne contamination. *IR 01-02*

** NEGATIVE FINDING the inspector toured the LLRW processing and storage facilities (Southwest Expansion Area/Drum Storage Area) and observed a polypak container (number A90238) on a carrier (number 117) in the upright condition which appeared to be partially open. The licensee investigated this condition and noted that the polypak contained incinerator ash with approximately [ ] U-235 content. In addition, the licensee stated that the incinerator ash was contained in plastic wrapping material. The inspector noted that the improper storage of this radiological material was not consistent with good radiological control practices which the licensee acknowledged and issued an Unusual Occurrence Report (Redbook Item). The polypak contents were then properly dispositioned. 02/16/2001

Ex 4

279 Container spacing in the uranium recovery dissolver area elevator was not adequate to meet criticality safety requirements and was identified as Violation 01-02-01. *IR 01-02*

** NOTICE OF VIOLATION On February 27, the inspectors observed the improper spacing of containers in the uranium recovery dissolver area elevator. The elevator's criticality safety posting required that containers (or stacks of containers) be spaced [ ] The inspectors found that the spacing was easily achievable by placing containers in each corner of the elevator. The inspectors observed that one container placed in the center of the elevator was within [ ] inches of containers stored in the corners of the elevator. Although the container in the center of the elevator was found to be empty, the criticality control for that area relied on container spacing, so that mass controls were not necessary. The inspectors discussed this situation with licensee management for corrective action. On March 1, 2001,

Ex 4

EXA

the inspectors observed similar improper container spacing in the uranium recovery dissolver area elevator. This time, two containers had been placed in the center of the elevator, but the spacing between containers was only about [ ]nches and the containers in the center of the elevator were not empty. These two examples of the failure to follow posted safety requirements were identified as Violation (VIO) 01-02-01. 03/02/2001

294 Container spacing in the uranium powder mixing hoods was not adequate to meet criticality safety requirements and was identified as VIO 01-03-01. *IR 01-03*

EXA

** NOTICE OF VIOLATION The inspector observed that specific operations were typically being performed safely and in accordance with approved plant procedures and postings. However, on May 8, the inspector observed the improper spacing of containers in the uranium powder mixing hoods. The criticality safety postings for these hoods required that containers with more than a [ ]depth be spaced at least [ ]nches from any other container. The inspector observed that in [ ]process lines, polypaks containing Special Nuclear Material (SNM) were being stored in a configuration that was less than [ ]inches from the nearest container of SNM. The inspector observed that the licensee's nuclear criticality safety analysis was based on mass and moderation control, and not on container spacing. However, the mass limit was implemented through the spacing requirements such that, if followed, an unsafe mass could not be accumulated in the hoods. The actual amount of material involved in any of the spacing violations did not approach the mass limits of the station, but the failure to follow the spacing limits created the potential for mass limits to be exceeded.

These examples of the failure to follow posted safety requirements were identified as Violation (VIO) 01-03-01. This violation is similar to a violation cited in NRC Inspection Report 70-1151/2001-02. For that violation the licensee took short-term corrective actions described in a letter to the NRC dated April 30, 2001 that should have been adequate to prevent recurrence. The corrective action, however, was not adequate to prevent recurrence in that the current violation occurred. A notice of violation is therefore being issued for this violation.

293 Six apparent violations were identified as part of a Special Team Inspection to investigate the common mode failure of multiple criticality safety controls in the ADU process lines due to errors in the configuration of a system of programmable logic controllers. Five violations were cited in the subsequent NOV. This inspection was a follow-up to PIM item #292. *EA#01-174, IR 01-202 & PIM Item #292*

- Section 2.0 of licensee procedure RA-107, Revision 10 (dated March 29, 2001), titled "Internal Reorting, and NRC Notification of Unusual Occurrences", states, in part,

Management Controls

Procedures Unclear or Contradictory - 227, 244, 263, 344, 230, 233, 235, 325

- Consistency and Clarity of Procedures

227 A violation of Section 3.4.1 of the License Application occurred for the failure to conduct radioactive materials package unloading activities in accordance with the requirements of chemical operating procedure COP-836041. The licensee's root cause determination and corrective actions to prevent recurrence were acceptable. *IR 00-03*

EXA

** NOTICE OF VIOLATION On May 2, 2000, the inspector observed the licensee perform incoming receipt surveys of [ ]containing UNH crystals. The UNH crystals were received from the [ ]on May 1, 2000, at approximately 10:45 p.m. Upon receipt, the licensee performed both direct radiation surveys and surface contamination surveys of the transport trailer containing the [ ]of UNH crystals. The trailer was secured with a tamper safe seal which was not removed until May 2 at approximately 1:00 p.m. when the licensee began to perform individual surveys of the [ ]containing the UNH crystals. The inspector observed the licensee perform direct surveys for alpha and beta/gamma radiation and surveys for removable surface contamination of five drums in accordance with regulatory operations procedure ROP-02-008, Surveys of Incoming Shipment of Radioactive Materials, Rev. 7, dated March 2, 2000. The licensee used appropriate instrumentation and survey techniques. Sufficient smears and measurements were taken in the most appropriate locations to yield a representative assessment of the non-fixed contamination levels. From a review of the records, none of the receipt survey results indicated that the limits specified in 49

CFR 173.441 or 173.443 were exceeded.

On May 3, 2000, the inspector observed licensee operators perform the opening of the package and removal of the UNH crystals from the inner packaging. This process was controlled by chemical operating procedure COP-836041, Receipt of Uranium Scrap Shipments from Outside Sources, Rev. 1, dated February 22, 2000. The inspector noted that an operator did not follow step 8 of COP-836041, which required placing the pail of UNH crystals on a clean piece of paper inside the UNH crystal enclosure hood. The purpose of placing the material inside the hood was to reduce the potential airborne radioactivity concentrations in the work area and contamination control. Instead, the operator opened the pail on the floor outside of the UNH crystal enclosure hood, removed the opened plastic bag of UNH crystals, and then placed the opened plastic bag of UNH crystals in the enclosure. The inspector noted that the COP-836041 was not available at the job location. Upon discovery of the procedural violation, a licensee representative immediately notified the area supervisor who temporarily ceased operations until corrective actions could be implemented. During the licensee's review, it appeared that not all of the operators were aware of Step 8 requirements.

After a review of the problem, the licensee determined that the primary root cause was that the processing of incoming scrap material was not a continuous operation. The operation was performed as the material was received. The receipt of this material had been discontinued for several weeks due to the plant being shutdown for maintenance and inventory. Although the operator initially reviewed the chemical operating procedure, the operator did not review the procedure after the several weeks of not performing the operation. Part of the corrective action taken was counseling the operator about his actions and the necessity of following the procedures. In addition, all of the URRS operators were retrained on the procedure and on the importance of following all procedures. A secondary cause was the procedure had some sections which could be confusing. To prevent recurrence, the licensee had initiated the revision of COP-836041 so that the requirements for opening the packages were delineated in a clearer manner. All procedures are currently being revised by an outside professional procedure writing group. This procedure has been given a priority status for revision. The inspector determined that the information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence was adequately addressed. The inspector discussed the event with licensee representatives, and indicated that a violation of Section 3.4.1 of the License Application occurred (VIO: 70-1151/00-03-01: Failure to conduct radioactive materials package unloading activities in accordance with the requirements of COP-836041). 05/04/2000

ERROR BY KNOWLEDGEABLE PERSON ON FIRST WORKING DAY AFTER TIME OFF CONFUSING OR OVERLY COMPLEX PROCEDURES

244 The licensee's internal audit program was effective in identifying an inconsistency between the safety analysis and the procedure for handling contaminated high efficiency particulate air (HEPA) filters. The licensee properly categorized the situation as a notifiable event. The licensee's root cause evaluation adequately identified causes and proposed appropriate corrective actions. (Section 2.e) *IR 70-1151/2000-05*

** POSITIVE FINDING

RESERVED 09/19/2000

263 Revisions to safety requirements for storage of waste drums were not posted in a timely manner. *IR 00-06*

** NEGATIVE FINDING The inspector observed the storage of licensed material throughout the facility. The inspector observed that waste drums were being stored in arrays and racks in the southwest expansion area of the facility. The inspector observed three different criticality safety postings in the area, each with differing (and sometimes conflicting) requirements for the same storage containers. The inspector discussed the inconsistencies with the area safety engineer and found that the postings had been recently revised to accommodate storage of containers moved from the southeast expansion area to make space for the BAES project (see Section 2.a). However, the licensee had not completed replacing the postings prior to relocating the containers. The inspector found that the containers were being stored in accordance with the revised posting. The licensee completed replacing the postings before the end of this inspection. 11/17/2000

INADEQUATE COORDINATION BETWEEN ORGANIZATIONAL UNITS

344 The licensee's process support procedures adequately covered the steps to take during off-normal conditions or loss of utilities. However, the procedures for sampling recycled material from the erbia process for moisture was not consistent with the licensee's safety analyses. The inspectors informed the licensee that prior to introducing uranium recycle material generated from the erbia process to the blender, this discrepancy must be corrected. *IR 01-07*

** NEGATIVE FINDING The inspectors reviewed the licensee's general support procedures for the erbia process operations. This included procedures for safety significant laboratory analyses, operation of utility systems, and performing functional verifications of safety controls. The inspectors also reviewed procedures for the operation of nearby equipment that used flammable gases. The inspectors found that the procedures for utilities adequately covered the steps to take during off-normal conditions or loss of utilities. The inspectors found that the procedures for performing functional verifications of safety provided adequate instructions for testing the functionality of safety controls, and that all engineered safety controls identified in the licensee's safety analyses were covered by the procedures. The inspectors observed portions of the functional tests being performed and found them to be well planned and adequate to verify the functionality of the safety controls.

Since moderation control in the unfavorable geometry blender was the sole method for ensuring criticality safety of the blender, the inspectors reviewed the procedures for sampling and analyzing materials added to the blender. This included procedures for sampling recycled uranium oxide powder from the erbia process that did not previously meet specification. The inspectors found that the procedures for sampling this recycled material was not consistent with the licensee's safety analyses. The inspectors found that the ISA used to approve the license amendment required that all powder added to the blender be confirmed to be less than a prescribed moisture limit by two independent laboratory analyses. However, the sampling procedures involved performing composite sampling of multiple containers of recycle material for the first analysis, and randomly sampling a small number of these containers for the second moisture overcheck analyses. The inspectors pointed out that these sampling methods were not adequate to confirm that all powder added to the blender was less than the moisture limit. The inspectors discussed the situation with the NRC license reviewer and subsequently informed the licensee that prior to introducing uranium recycle material generated from the erbia process to the blender, this discrepancy must be corrected. This would involve either changing the sampling procedure to match the safety analysis or revising the safety analysis and obtaining approval of the revision from the NRC licensing function. The licensee stated that the erbia blending process would have to be operated a considerable time before it generated enough recycle material to add back to the process. Thus, the correction of this discrepancy did not affect the initial start-up of the blending process.
10/12/2001

INADEQUATE COORDINATION BETWEEN ORGANIZATIONAL UNITS
INCOMPLETE SAFETY BASIS

230 Operating procedure for handling and shredding contaminated HEPA filters instructed workers contrary to the approved Criticality Safety Evaluation. *EN#37189*

** LICENSEE EVENT REPORTS The licensee discovered an inadequate procedure during a routine audit when it was found that an administrative safety control identified in a Criticality Safety Evaluation (CSE) was not properly proceduralized. The inadequacy occurred in the method for handling and disposing of used HEPA filters. Typically, used HEPA filters are scanned upon removal from process. If the scan value is less than [redacted] the filter media is removed from the filter frame, shredded, and sent to an incinerator. According to the CSE, if the scan value is greater than [redacted] the filter media is to be bagged and sent directly to the incinerator without shredding. The shredding process evidently aids in the combustion of the filters. Filters that have a high scan value are not to be processed through the shredding system because the shredder hopper and receiving barrel are of unfavorable geometry. The procedure for processing filter media with high scan values instructed the operators to "place paper filter media into a 30-gal paper bag for shredding", which is contrary to the CSE assumptions that high scan media is not to be shredded. This operation was being performed per the approved operating procedure, and high scan media was being shredded prior to incineration. The CSE documented the prevention of shredding the high scan filter media as an administrative criticality safety mass control. Thus when it was discovered that the operating procedure instructed operators to shred the high scan filter media, the licensee determined that this constituted a loss of one criticality control.

Ex A

PROCEDURES NOT COMPLETE OR ACCURATE 07/26/2000

233 The Site Emergency Plan (SEP) and the Emergency Procedure governing evacuation and accountability were inconsistent regarding the location for evacuees to assemble.
IR 00-04

** NEGATIVE FINDING Section 7.0 and Figure 1 of Emergency Procedure A-03 entitled "Evacuation and Accountability" was determined to be inconsistent with Section 5.4.1.2 and Figure 5.1 of the SEP. The inconsistency was associated with the assembly location following a plant evacuation. The referenced sections of the SEP reflected two locations (south gate near the guard shack, and the flagpole near administration building) whereas the procedure included only the flag pole. The licensee contact indicated that the procedure was correct and the SEP required a revision for consistency with the procedure and general employee training material. The inspector conducted interviews regarding evacuation and assembly locations with randomly selected employees and discovered that procedures and training discussed a single location (flag pole) and the SEP required updating as indicated by the licensee contact. The inspector informed the licensee of bulletin board locations where the evacuation diagram posted was identical to the diagram in the SEP (showing two assembly points). In response the licensee expressed plans to conduct a site wide inspection to replace evacuation diagrams with the correct information and update the SEP information. Additional procedural reviews identified incorrect references that were discussed during a previous inspection but had not been resolved. Consequently, the inspector informed plant management during the exit interview that lack of attention may have resulted in repeat errors and management attention may be necessary to resolve the errors.

PROCEDURES NOT COMPLETE OR ACCURATE 06/30/2000

235 Results from accountability/evacuation drills conducted during August 1999, and April 2000, disclosed problems with equipment, concept of operations, procedures, and human errors.
IR 00-04

** WEAKNESS The last biennial exercise was conducted on September 21, 1999, and involved participation by Richland County Emergency Medical Services and the local hospital. Participation by other offsite agencies was limited to notifications only. The next scheduled exercise to fulfill the biennial requirements in Section 7.4 of the Plan would be held in calendar year (CY) 2001. During the review of training details, the inspector noted that tabletop scenarios were presented to ERO personnel to assess the effectiveness of training for participants. The inspector discussed and reviewed documentation associated with the fire/criticality alarm system familiarization sounding and periodic evacuation drills. The results disclosed a frequency for conducting periodic evacuation drills had not been established procedurally nor was required by the license. According to the licensee, prior to August 1999, the last such drill was conducted in 1994. As a program improvement item, the licensee expressed a commitment to conduct evacuation drills at least annually if not semiannually. Results from the recent drills conducted during August 1999, and April 2000, disclosed problems with equipment, concept of operations, procedures, and human errors. In response to drill results, the licensee indicated that the following actions were being considered: 1) replacement of the criticality warning system; 2) determine if additional card readers are needed; 3) revise procedures to include Evacuation Coordinators and assign assembly areas based on work unit or department; and 4) training. The licensee indicated that a remedial evacuation drill will be held following the implementation of corrective actions. The inspector determined that the licensee's procedures for conducting accountability of personnel following an evacuation were minimally acceptable, but improvements were necessary to ensure accountability was both timely and complete. The inspector informed the licensee that the corrective actions to ensure timely and complete accountability of personnel was considered an inspector follow up item (IFI 70-1151/2000-04-02). 06/30/2000

325 Four examples were found where control documents were not maintained current and up-to-date. A formal procedure delineating the responsibility and required actions governing the formal review and approval of changes to the SEP and Emergency Procedures (EPs) did not exist.
IR 01-06

** NEGATIVE FINDING No procedure changes were made since the last inspection. The licensee discussed

during the inspection intentions to completely rewrite the procedures after Plan changes were approved. Control copies of procedures were checked at several different locations and four examples were noted where a procedure may have been revised, but had not been replaced. The licensee took immediate action to replace any superceded copy with the current version. Regarding the administrative system for the review and approval of changes to the SEP and EPs, the inspector was informed that a procedure delineating responsibility and required actions governing the formal review and approval of the SEP and EP's did not exist. The licensee acknowledged the need for such procedure and committed to the development and implementation of a procedure governing the review and approval of changes to the SEP and EPs. 07/13/2001

PROCEDURES NOT ESTABLISHED
INADEQUATE TASK CONTROL

Quality Assurance - 207, 269/270, 315

207 Weld repairs to MCC-3 shipping containers were made by Westinghouse employees that had been trained by a contractor that was not on the Westinghouse Qualified Supplier List.
30 day report dtd 4/7/2000 & IR 00-03

** LICENSEE EVENT REPORTS In October 1999, it was determined that several Model MCC-3 shipping containers had an incorrect weld pattern on the top shell. At that time all containers with this weld pattern were taken out of service and a plan was developed to add welds to meet the licensed drawing requirement. The plan involved using Westinghouse welders who were certified to the requirements for welding safety related parts on shipping containers. However, the welders had received their training and certification from the same supplier that was already under contract to provide general welding services. This supplier was not on the Westinghouse Qualified Supplier List (QSL). Westinghouse issued a blanket purchase order to the supplier to provide the ASME code welding certification services. Blanket purchase orders with existing suppliers for maintenance services are not generally routed through Product Assurance. Had a separate purchase order been issued for shipping container welding, the Purchasing Department would have routed the requisition to Product Assurance for approval. Product Assurance would have denied the requisition because the requested supplier was not on the Westinghouse QSL. 03/13/2000

INADEQUATE COORDINATION BETWEEN ORGANIZATIONAL UNITS

269 The bottom nozzle holddown assemblies for the MCC-5 shipping containers were found to not have been fabricated by a qualified vendor as required by the licensee's QA program.
ADAMS ML003780786

** LICENSEE EVENT REPORTS The bottom nozzle holddown assembly is used exclusively with the MCC-5 shipping container, to help secure the VVER- 1000 fuel assembly in the container. Neither the MCC-3 or MCC-4 containers are involved.

All bottom nozzle holddown assemblies for these containers were fabricated by the same supplier in 1995. Fabrication records indicate that the assemblies were correctly manufactured in accordance with requirements for safety-related items. Westinghouse Product Assurance verified that the assemblies were manufactured in strict accordance to drawings and specifications. The criteria for Category A safety-related items and Category B safety-related items are essentially the same, a primary difference being that it is not necessary that Category B items be manufactured by a qualified supplier. 11/28/2000

ERROR BY KNOWLEDGEABLE PERSON FOR UNKNOWN REASON

270 The bottom nozzle holddown assembly for the NCC-5 shipping containers was found to not be included on the MCCL501 series License Drawing. (Configuration Control Problem)
ADAMS ML003780786

** LICENSEE EVENT REPORTS In the process of investigating why the Category A safety-related item was not manufactured by a qualified supplier, it was discovered that the bottom nozzle holddown assembly was not identified on the MCCL501 series License drawing as a safety-related item. The holddown assemblies were fabricated several years after the containers were made and it is believed that failure to add them to the License drawing was merely an administrative oversight. The holddown assembly is correctly identified in the specifications and the equipment drawing as safety-related.

UNKNOWN 11/28/2000

INADEQUATE COORDINATION BETWEEN ORGANIZATIONAL UNITS

315 The quality assurance program did not ensure that licensee audits would focus on compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 61.56
IR 01-05

** NEGATIVE FINDING The inspector reviewed internal audit WEC-01-02, dated March 2001 and two low level radioactive waste (LLRW) audits conducted in 1999 and 2000. The LLRW audit addressed waste generation, segregation, decontamination, sorting, packaging, surveying, labeling, shipping, and record keeping. The inspector discussed with the licensee the need for the Westinghouse Quality Assurance (QA) program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 61.56. The nature and scope of the QA program will vary depending on the changes and complexity of the waste stream. The licensee acknowledged the inspector's comments and indicated that this area would be focused on during subsequent audits. 06/07/2001

MANAGEMENT EXPECTATIONS NOT ESTABLISHED

Corrective Actions (positive) - 200

200 Radiological activity in liquid effluents had increased approximately 21 percent during the first half of 1999 versus last half of 1998 levels. The licensee had formulated an action plan and had implemented corrective actions in order to reduce radioactivity in liquid effluents. Preliminary data indicated that activity concentrations had been reduced to acceptable levels by implementation of the licensee's corrective actions.
IR 00-01

** DESIGN ISSUES The total activity released during the first half of 1999 had increased approximately 21 percent over last half of 1998 totals. In addition, the inspector noted that liquid effluent concentrations during the first three quarters of 1999 had averaged approximately 5.0 E-07 (μCi/ml) in comparison to the unrestricted release limit goal of 3.0 E-07 μCi/ml. The licensee stated that one major reason suspected for this increase in liquid effluent concentrations was increased solubility of uranium in effluents due to acidic conditions in the East Pond. The licensee had formulated an action plan to minimize uranium activity in liquid effluents and had instituted corrective actions. The inspector noted that the October liquid effluent activity concentration had decreased to approximately 2.6 E-07 μCi/ml after completion of the licensee's corrective action of neutralization of acidic drainage to the East Pond from the de-Ionized WTF cation regeneration process.
02/04/2000

Corrective Actions (negative) - 229, 267, 271/272

229 The licensee identified two violations involving the package effectiveness for fuel assembly shipping containers during April 2000. The corrective actions for the administrative problem appeared to be adequate to prevent recurrence. However, a violation for the failure to assure prompt correction of identified shipping container non-conformances was identified.
IR 00-03

** NOTICE OF VIOLATION The inspector reviewed two reduction in package effectiveness reports submitted on April 7 and April 25, 2000, in accordance with the requirements specified in 10 CFR 71.95(a).

The 10 CFR 71.95(a) report, dated April 7, 2000, pertained to a violation that Westinghouse welders, who were performing safety-related welds on the Model MCC-3 fuel shipping containers were certified by a company that was ASME code certified, but was not on the Westinghouse Qualified Supplier List (QSL). The Westinghouse welders had received their training and certification from the same supplier that was already under contract to provide general welding services. However, the supplier was not on the Westinghouse QSL. The licensee had issued a blanket purchase order to the supplier to provide the ASME code welding certification services. Blanket purchase orders with existing suppliers were normally not routed through Product Assurance. Had a separate purchase order been issued for the shipping container welding, the Purchasing Department would have routed the requisition to the Product Assurance Department for approval. After reviewing the issue, the inspector noted that the violation was an administrative quality compliance issue. Immediate corrective actions included the issuance of a Corrective Action Report (CAR 00-0149); suspension of the welding until the CAR finding was resolved; and removing the affected containers identified in October 1999 out of service. To prevent recurrence, the licensee audited the supplier on April 4, 2000; ensuring that any material, items, or services for qualification of welders are provided by Westinghouse or procured from a supplier listed on the QSL; perform an annual audit of this supplier; and hold a pre-award meeting prior to the placement of an order for welder qualifications to assure compliance with order requirements.

The 10 CFR 71.95(a) report, dated April 25, 2000, pertained to a violation that occurred on or about March 24, 2000 when the licensee discovered that one Model MCC-3 shipping container (Serial Number M178) had been used for fuel shipments which did not reflect the minimum weld pattern on the container shell as described in License Drawing MCCL-301. The license drawing was part of the NRC CoC 9239, Rev. 10, USA/9239/AF, Model Nos. MCC-3, MCC-4, and MCC-5. Specifically, MCCL-301 specifies that skip welds are to be made in 16 locations on the external rollover angle bars on the bottom half of the container shells. Two licensee employees were assigned to inspect all shipping containers, specifically verifying that all safety-related parts comply with License requirements. This action was taken in response to similar violations that occurred in April 1997 and October 1999 and documented as a 10 CFR 71.95(a) reports dated May 22, 1997 and November 23, 1999, respectively. During the March 24, 2000 inspection, it was discovered that container M178 had the skip welds in only 12 locations.

This problem originally became apparent in April 1997, when it was determined that several Model MCC-3 shipping containers had an incorrect weld pattern on the bottom half of the container shells. At that time, all containers with the out of specification weld pattern were taken out of service. A plan was developed to add welds to meet the license drawing requirement. In addition, a procedure was implemented to verify the proper weld patterns during container refurbishment so that the containers that were off-site at the time of the violation would be inspected and corrected prior to next use. During that time, approximately 200 containers were inspected, with 79 containers identified as having the incorrect weld patterns. However, container M178 was not identified. The licensee determined that M178 was in Taiwan at the time of the discovery of the weld deficiencies and was not segregated upon return to the Columbia Plant. On October 25, 1999, it was discovered that certain Model MCC-3 shipping containers had been used for fuel shipments which did not reflect the weld pattern on the upper container shell as specified in license drawing MCCL-301. Specifically, the licensee discovered that some of the MCC-3 containers in use had skip weld patterns which exceeded the 10-inch center-to-center requirement specified in drawing MCCL-301.

During interviews with the licensee, the inspector determined that shipping container M178 had been used twice to ship fuel assemblies during the months of January and February 2000. After reviewing this issue, the inspector identified this problem as a violation of 10 CFR 71.133 requirements (VIO: 70-1151/00-03-02: Failure to assure that shipping container non-compliances were promptly corrected). The licensee's immediate corrective actions included the removal of M178 from service and resuming the inspection of all containers. To prevent recurrence, the licensee assigned two employees to inspect safety-related parts for all containers and to develop a plan for further training. Given the circumstances regarding the location of the M178 container when this problem was initially discovered in 1997, the inspector determined that the information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence was adequately addressed. 05/04/2000

INADEQUATE CORRECTION OF IDENTIFIED PROBLEMS
INADEQUATE TASK CONTROL

267 Corrective actions to Violation 00-02-02 were not completed by the date committed to NRC.
IR 00-06, VIO 00-02-02

** NEGATIVE FINDING The inspector reviewed the licensee's actions in response to violation (VIO) 00-02-02 concerning inadequate configuration management of uranyl nitrate piping system. In a letter dated May 25, 2000, the licensee had committed to completing certain corrective actions by June 30, 2000 in response to the violation. However, the inspector found that the corrective actions had not been completed as committed. The licensee indicated that upon further study, the original corrective actions were not feasible and the response to the violation would be revised. The revised response was received by the inspector on December 6, 2000, with a revised completion date of December 31, 2000. Thus VIO 00-02-02 remained open. 11/17/2000

MANAGEMENT EXPECTATIONS NOT ENFORCED

271 A violation was identified for the licensee's failure to complete corrective actions from the 1998 vaporizer level probe event and for the failure to conduct an adequate root cause analysis of the 2000 vaporizer level probe event.
IR 00-204

** NOTICE OF VIOLATION The licensee removes UF6 from cylinders by heating the cylinders with steam in one of three vaporizers. The vaporizer has a space between the cylinder and the vaporizer inner wall that is large enough to be a criticality concern if steam condensate accumulates and is subsequently mixed with released UF6 from the cylinder. Control of condensate through drainage is assured by a level probe which is in a pot connected by a separate and smaller drain line from the vaporizer. On October 18, 2000, the line to the level probe became blocked by paint from a cylinder so that the probe could not read the condensate level thereby compromising the NCS control even though the primary vaporizer condensate drain still worked. The event was reported to the NRC in accordance with licensee commitments under NRC Bulletin 91-01.

The licensee investigated the vaporizer event and determined that it was similar to an event that occurred in July of 1998 when paint from a UF6 cylinder blocked the drain to the level probe well. Due to the similarity to the 1998 event, the licensee elected not to perform a complete root cause analysis. Instead, the licensee reviewed the conclusions of the previous root cause analysis and determined that completion of previously suggested corrective actions would be sufficient. The inspector reviewed the licensee's incident investigation reports for both the 2000 event and the 1998 event and determined that both events occurred in the same vaporizer which is one of three vaporizers that the licensee uses to feed the Ammonium Di-urinate (ADU) conversion process. Subsequent to the 1998 event, the licensee's root cause analysis recommended and the Incident Review Committee approved, the corrective action of design and installation of modified screens in the vaporizer to prevent paint chips from blocking the level probe line and this corrective action was eventually combined with an earlier initiative to install a spacer to reduce the vaporizer volume. The licensee did not impose any interim compensatory measures on vaporizer operations subsequent to the 1998 event.

The inspector determined that the corrective actions for the 1998 event had never been completed. The licensee indicated that the incomplete corrective actions were repeatedly deferred due to competing demands. The inspector determined that there was no immediate safety concern because the licensee had imposed two interim compensatory measures subsequent to the 2000 event to assure criticality safety. The interim compensatory measures were to conduct special inspections of UF6 cylinders to detect suspect paint prior to placing them into the vaporizers and reducing the vaporizer blow-down interval from once per shift to once every two hours to assure that condensate could not accumulate in an amount posing a criticality safety hazard. The licensee committed to assign a higher priority to the screen and spacer installation corrective actions to ensure timely completion. The inspector determined that failure to complete the assigned corrective action did not comply with license section 3.7 or licensee procedure RA-111. Failure to complete a corrective action identified by a root cause evaluation of a 1998 event and approved by the Incident Review Committee is an example of Violation (VIO) 70-1151/2000-204-01. The inspector noted that the licensee's investigation report for the October 2000 event consisted of a one and one-half page memorandum which was inserted into the front of the data pack for the 1998 event. The inspector observed that the brief investigation report had failed to recognize that the corrective actions from the first event had not been completed and, therefore, did not recommend their completion. The inspector also questioned the fact that the 2000 event had occurred in the same vaporizer as the 1998 event which might not necessarily be a coincidence. Discussion with licensee staff indicated that the repeat failure of the same level probe was reviewed by attempting to find any difference between the subject vaporizer and the other vaporizers. The licensee found no difference between any of the vaporizers and

level pots and determined the multiple failure in the same piece of equipment to be a coincidence but did not discuss the evaluation in the memorandum. The inspector noted that this was an aspect of the event that could not have been covered by the previous root cause analysis and therefore should have been documented. The inspector determined that the licensee had not made an adequate specific cause determination and promptly identify that corrective actions from a previous event in the same vaporizer were not yet complete. As a result of the inadequate specific cause determination, the licensee failed to present adequate results to the committee for approval in accordance with license section 3.7 or licensee procedure RA-111. The failure to make an adequate specific cause determination, promptly identify that corrective actions from a previous event in the same vaporizer were not yet complete, and present adequate results to the committee for approval is a second example of VIO 70-1151/2000-204-01.

INADEQUATE CORRECTION OF IDENTIFIED PROBLEMS
MANAGEMENT EXPECTATIONS NOT ENFORCED 12/08/2000

272 The licensee's identification, resolution, and correction of safety related problems failed to prevent recurrence of a risk significant event. *IR 00-204*

** WEAKNESS The inspector observed that the licensee does not have a uniform method for developing, assigning, and tracking corrective actions. The inspector determined that corrective actions are assigned in accordance with licensee procedure RA-111 to a manager or supervisor who is then responsible for identifying what corrective actions are required, assigning the actions to staff, and seeing that actions are completed. The informality of the licensee's corrective action system and the assignment of corrective actions by a lower level manager or supervisor is a weakness in the licensee's program which contributed to the preceding violations. The licensee acknowledged this concern and indicated that the concern would be reviewed with respect to implementation of a new and more robust commitment tracking system. The licensee's actions to clarify corrective action responsibilities and implement a new and more robust commitment tracking system will be tracked as Inspection Follow-up Item (IFI) 70-1151/2000-204-02.

INADEQUATE CORRECTION OF IDENTIFIED PROBLEMS
MANAGEMENT EXPECTATIONS NOT ENFORCED 12/08/2000