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101 MARIETTA STREET, N.W.
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Report No.: 70-1151/92-09

Licensee: Westinghouse Electric Corporation
Commercial Nuclear Fuel Division
Columbia, SC 29250

Docket No.: 70-1151

License No.: SNM-1107

Facility Name: Columbia Nuclear Fuel Plant

Inspection Conducted: October 28 and 29, 1992

Inspector: E. J. McAlpine for 12/1/92
C. H. Bassett Date Signed

Accompanying Personnel: George B. nger

Approved by: E. J. McAlpine 12/1/92
E. J. McAlpine, Chief Date Signed
Radiation Safety Projects Section
Nuclear Materials Safety and Safeguards
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection involved review of the nuclear criticality safety program with specific emphasis on the licensee's program regarding identification, elimination, and/or control of moveable, non-favorable geometry (MNFG) containers throughout the facility. Also reviewed was an incident involving discovery of enriched UO₂ pellets loaded into a cart specifically designated for natural uranium pellets only.

Results:

The licensee had developed a listing of nearly all of the MNFG containers in the facility and had removed the majority of those that had been identified for removal. Some training concerning the limitations on the use of the MNFG containers had been given to all personnel who worked in the Chemical Area of the facility by means of Work Place Scripts.

General controls for maintaining MNFG containers only in the specific areas of the facility had been implemented as of the date of the inspection, but specific controls had not been determined. However, the licensee was in the process of developing such controls and outlining them in procedures.

Surveillances were being performed by Safety Observers to ensure that no new MNFG containers were introduced into the controlled area.

The Nuclear Safety Analyses (NSAs) pertaining to those MNFG containers that were to remain in use were being performed by the Regulatory Engineering staff. According to the licensee, the high priority NSAs will be completed by the end of this year.

Within the scope of the inspection, no violations or deviations were identified. However, various MNFG containers were noted by the inspector in several areas of the facility that had not been listed by the licensee. Also, inconsistencies were noted in the areas of: 1) posting of areas, 2) the use of MNFG containers for collecting trash, and 3) storage of empty favorable geometry containers.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *R. Allen, Manager, Chemical Process Engineering
- W. Barber, Shift Supervisor, Waste Recovery and Disposal
- H. Doctor, Shift Supervisor, Integrated Fuel Burnable Assembly (IFBA)
- D. Goldbach, Manager, Waste Recovery and Disposal (WR&D)
- *W. Goodwin, Manager, Regulatory Affairs
- *R. Koga, Plant Manager
- *E. Keelen, Manager, Fuel Manufacturing
- *D. Matthews, Manager, Inspection
- *S. McDonald, Manager, Technical Services
- E. Reitler, Manager, Regulatory Engineering
- *C. Sanders, Manager, Nuclear Materials Management & Product Records
- L. Turner, Shift Supervisor, WR&D
- *D. Williams, Regulatory Engineer
- *R. Williams, Technical Coordinator, Regulatory Affairs

Other licensee employees contacted during the inspection included engineers, technicians, operators, and office personnel.

*Attended the exit interview on October 29, 1992

2. Operations Review (88015, 88020)

During an NRC Operational Safety Assessment (OSA), which was conducted at the licensee's facility during August 17-28, 1992, questions were raised concerning the use and control of moveable, non-favorable geometry (MNFG) containers in the Chemical Area. Following the OSA, the licensee formed a multi-disciplined team to review the MNFG container issue and formulate recommendations to resolve the problem. As a result of the OSA and telephone conversations between the licensee and the NRC, the licensee began providing bi-weekly status reports on the progress they were making in identifying the MNFG containers that were present in the Chemical Area and eliminating those MNFG containers that were not needed. As of the date of the inspection, three bi-weekly status reports had been issued and were dated September 18, 1992, October 2, 1992, and October 16, 1992.

a. MNFG Container Identification and Elimination

During the period from August 28-31, 1992, the licensee performed an inventory of the MNFG containers in the Chemical Area of the facility. Initially, the licensee counted the MNFG containers (most were 55-gallon drums) in all the production and non-production areas of the Chemical Area. The decision was then made that 55-gallon drums would continue to be used in the Waste Recovery and Disposal (WR&D) area for waste accumulation, assaying, packaging, and disposal. When the WR&D MNFG containers

were removed from the inventory, the total showed that approximately 450 MNFG containers were located in the production and non-production areas.

The team, designated as the NFG team, then began to characterize and evaluate the MNFG containers to determine which ones were needed and which ones could be eliminated from the various areas. Although the process appeared to the NRC to be progressing slowly, the characterization and evaluation of the MNFG containers was completed by September 18 and the NFG team made recommendations to management for the elimination of certain MNFG containers on September 23. As of the date of the inspection, the licensee had determined that 120 MNFG containers were appropriate for continued use in production and non-production portions of the Chemical Area.

b. Training

The licensee provided training for all personnel who worked in the Chemical Area of the facility by means of Work Place Scripts. This training material was issued by the Plant Manager and was reviewed with all personnel by their supervisors during work place meetings held September 1, 1992. The scripts stipulated that MNFG containers were any movable containers that were greater than 10 inches in diameter, had a volume greater than 5-gallons, or could accumulate material to a slab height of greater than 4 inches (excluding mop buckets). The scripts also detailed the very limited uses of these containers and stipulated that the MNFG containers could not be used to collect uranium bearing material (liquid) under any circumstances. All waste and other material placed in the MNFG containers was required to be measured for the presence of Special Nuclear Material (SNM) first.

Due to problems that were subsequently created with the use of smaller trash collection receptacles, two other Work Place Meeting Scripts were also given to those working in the Chemical Area on September 30 and October 23, 1992. These scripts required that all trash be placed in 5-gallon collection containers and that high level and low level waste be kept separate.

On October 23, 1992, another script was prepared and provided to those working in the Chemical Area. It reiterated the definition of a MNFG container, detailed what the NFG team had been doing with respect to solving the MNFG container problem, outlined the use of MNFG containers, and gave information on what had happened to the MNFG containers that had been removed from the facility and the reason for the removal of the containers.

c. MNFG Container Control

As of October 29, 1992, no specific controls had been developed for the continued use of those MNFG containers that remained in the Chemical Area. The only controls that existed were those established through the Work Place Meeting Scripts. As described above, the scripts outlined the limitations on the uses of the remaining containers and stipulated that no new MNFG containers could be introduced into the area unless specifically authorized by Regulatory Affairs. A Supplemental Operating Instruction (SOI) was also issued which contained a listing of the number of MNFG containers that were authorized in each production and non-production area. But although the SOI contained the listing of authorized MNFG containers, no other instructions or controls were given.

In order to check on compliance with the instructions which limited the use MNFG containers in the Chemical Area and to ensure that no new MNFG containers were introduced into the area, the NFG team enlisted the help of the Safety Observers. The Safety Observers in each area were provided a listing of the MNFG containers authorized to be in the areas and were asked to verify that only those on the list remained. Any deviations from those listed were to be reported by means of an entry in the "Red Book." (The "Red Book" is used by the licensee to document potentially significant problems and keep management and Regulatory Affairs apprised of such problems in a timely manner. The entries are made each shift [or as the need arises] and the entries are reviewed daily by Regulatory Engineers.)

During the inspection, the inspector attended a meeting that was called to discuss the best way to "legitimize" MNFG container controls and to determine in what type of document to specify the controls. It was generally agreed that a master document or "umbrella" document should be developed that would outline the overall control of MNFG containers and that specific controls would then be placed in the operating procedures for each specific area. The documentation of the general and specific controls for regulating the use of MNFG containers and compliance with the controls implemented was identified as an Inspector Followup Item (IFI) and will be reviewed during a future inspection (IFI 70-1151/92-09-01).

d. Nuclear Safety Analyses

Of the 120 MNFG containers that the licensee has determined will remain in use, approximately 50 have already had a nuclear safety analysis (NSA) performed covering their specific application. Of the 70 remaining MNFG containers, the licensee has grouped them into high priority and low priority categories. The high priority containers are those which are needed to perform operations

involving higher uranium content or frequent activity. The low priority containers are those that require analyses but which involve minimal or no amounts of uranium in the operations/activities they support. Through discussions with the licensee, the inspector determined that the formal NSAs for the high priority list containers are to be completed by December 31, 1992. The NSAs for those containers on the low priority list are scheduled to be completed by March 31, 1993. Training for personnel concerning the new NSAs and the affected procedures was to be completed within one month of the approval of the applicable Nuclear Safety Analyses. Completion of the NSAs for both categories of containers and the resultant training was identified as an IFI and will be reviewed during a future inspection (IFI 70-1151/92-09-02).

3. Facility Tours (88015, 88020)

During tours of the facility, the inspector observed the MNFG containers that remained in various parts of the Chemical Area. It was noted that respirator containers had been secured to a wall or to some other plant structural member by means of screws and/or bolts and that holes had been drilled in the bottoms to limit liquid accumulation. The inspector also noted that holes had been drilled in the clothing containers located near the exits of the controlled areas to limit liquid accumulation. It was further noted that the licensee had removed large trash containers from throughout the facility and 5-gallon cans with fire suppression lids were being used as trash receptacles in their place. The inspector noted that other MNFG containers had been placed in locked storage rooms, chained and padlocked in place, or had had the lids locked to prevent inadvertent liquid accumulation. These actions by the licensee had helped to eliminate numerous MNFG containers that had previously been located in the Chemical Area or had significantly decreased the possibility of using a MNFG container for collecting uranium bearing solutions.

However, the inspector noted several MNFG containers in various locations that were not listed on the inventory that the licensee had developed to specify the types and locations of those MNFG containers that were authorized for use. The inspector also noted inconsistencies in the areas of: 1) posting of areas, 2) the use of MNFG containers for collecting trash, and 3) storage of empty favorable geometry containers.

a. Unlisted MNFG Containers

During tours of the Ammonium Diuranate (ADU) Conversion area, the inspector noted that the wash basin located outside the Control Room could be classified as a MNFG container if the drain were to become plugged (as it was at the time of the inspection).

During tours of the UF6 Bay, the inspector noted the following MNFG containers which were not listed on the authorized MNFG inventory for the area:

- (1) A large yellow cart on wheels. Holes had been drilled in the cart to prevent liquid accumulation. The cart had previously been used to haul trash bags from the ADU area to the WR&D area. However, the cart was being used as a collection point for the trash bags removed from the 5-gallon trash cans. Using the cart in this manner would allow for the possible accumulation of a large amount of unmonitored uranium bearing material and it was, therefore, still a MNFG container.
- (2) A maintenance cart located near the shredder with a 6-inch deep top tray.
- (3) A large wooden box (approximately 3 feet by 3 feet by 4 feet [$\approx 3' \times 3' \times 4'$]) on wheels used to store assay standards.
- (4) A large respirator enclosure which was apparently going to be scraped.
- (5) Two vacuum cleaners in the maintenance shop.
- (6) Numerous mop buckets which were used as storage containers for such items as filters, bags of waste material, and other waste located between ADU lines 1 and 5.

During tours of the WR&D area, the inspector noted a cabinet located near the Solvent Extraction control room with storage bins inside that were approximately 12 inches deep.

During tours of the Maintenance area, the inspector noted the following MNFG containers which were not listed on the inventory of authorized containers:

- (1) An orange wooden box, $\approx 2' \times 2' \times 1'$, on wheels located in a (typically) locked tool storage area.
- (2) A grey wooden box, $\approx 2' \times 1' \times 1'$, located upstairs in a parts storage area.
- (3) One 6-gallon container located upstairs in the parts storage area.

During tours of the Integrated Fuel Burnable Assembly (IFBA) facility, the inspector noted the following MNFG containers which were not listed on the inventory of authorized containers:

- (1) Two 6-gallon containers.
- (2) A parts washer, with a wash basin $\approx 18" \times 12" \times 8"$, located in the locked archive room.
- (3) A 55-gallon drum located on the equipment mezzanine level.

During a tour of the Integrated Dry Route (IDR) Conversion area, the inspector noted the following MNFG containers which were not listed on the inventory of authorized containers:

- (1) An 8-gallon waste basket located in the IDR Control Room.
- (2) Large plastic bag on the third level near the blenders.
- (3) Another large plastic bag partially filled with other plastic bags located on the moderation controlled mezzanine area.
- (4) A respirator box near the sintering furnaces.

The inspector discussed these findings with the licensee. Licensee representatives indicated that they were still in the process of implementing the MNFG container control program and that they were not surprised that a few MNFG containers remained in the areas that were not on the inventory. Implementation of the MNFG container control program was identified as an IFI and will be reviewed during a future inspection (IFI 70-1151/92-09-03).

b. Inconsistent Application of Controls

As noted above, the inspector noted various examples of inconsistencies in posting areas, using MNFG containers, and storing empty containers.

During tours of the ADU Conversion area, the inspector noted that two HF spiking drums were positioned on the yellow painted areas on the floor outside the Control Room. The licensee uses yellow painted areas on the floor to designate nuclear material exclusion zones and nothing is to be placed in these areas. Also, numerous empty buckets were stacked on top of one another. This could form a MNFG container under certain conditions. Another item noted was the use of carts for storage of empty polypacks. The carts were not posted with any type of instructions limiting the use of the carts or detailing that only empty polypacks could be placed inside.

During tours of the UF6 Bay, the inspector noted that the use of the large yellow cart as a collection point for the trash from the 5-gallon cans posed a fire safety problem. Across from the cart were located four 55-gallon waste collection drums. There was no area posting to indicate what was to be placed in each drum or what the limits were on the materials that could be deposited therein.

During tours of the WR&D area, the inspector noted the following:

- (1) Near the Solvent Extraction Control Room, approximately ten "milk cans" and numerous polypacks were stored together with no lids in place. The entire storage area could become a MNFG container under certain accident conditions.
- (2) Two poly bags, containing what appeared to be used filters, were stored/stacked together on one storage spacer. One bag was in the middle of the spacer (as designed) and the other was setting on the edge of the spacer and partially on the next adjacent spacer.
- (3) There were storage racks in the area adjacent to the incinerator which were designated for 55-gallon drum storage. The posting indicated that only "clinker storage in drums" was authorized. However, the forms attached to the 55-gallon drums stored there indicated that the material inside was floor sludge.
- (4) Approximately thirty pallets were stored in the storage racks described above. These pallets were made of some type of polyvinyl material and, as such, represented a potential fire safety problem.

During tours of the IFBA facility, the inspector noted the following:

- (1) Approximately 12 empty mop buckets were stacked 3-high in a storage area.
- (2) Three partially full mop buckets were stored in the area but were not positioned in storage spacers. Spacers were available nearby.
- (3) Numerous 5-gallon buckets were stacked 2-high in spacers on the walkway outside of the Archive Storage mezzanine area and on the floor below. The buckets contained sand blast material. This appeared to be contradictory to the normal practice of limiting the number of buckets stored in a spacer to one.
- (4) Isopropanol was being stored on the stair landing outside the Archive Storage mezzanine area.

These items were discussed with the licensee. Because more information is required about these issues in order to ascertain whether they are acceptable or whether they violate a requirement, they will be tracked as an Unresolved Item (URI) and will be reviewed during a future inspection (URI 70-1151/92-09-04).

4. Incident Review (88015, 88020)

On the morning of October 27, 1992, the licensee discovered that 82.4 kilograms (kgs) of 4.0 weight percent (wt %) enriched UO_2 pellets had inadvertently been loaded into and stored in a pellet cart specifically designated for natural uranium pellets only. Upon discovery of this situation, the Area Manager immediately directed that the pellets be removed from the cart and transferred to favorable geometry polypacks. Because one of the barriers to prevent criticality was lost, i.e. the administrative control that prohibited loading enriched pellets in the cart and exceeding the minimum critical reflected mass of 60 kgs, the licensee notified the NRC on October 28, 1992.

The licensee's preliminary investigation of the incident disclosed the following:

- The pelleting equipment involved, Manufacturing Automation Project (MAP) Line #2, had been grinding natural pellets between October 16 and October 20. The 4.0 wt % grinding campaign began October 21 following an enrichment clean-out (ECO).
- ECO documentation indicated that all natural pellet carts had been removed from the area. (The licensee was investigating how the wrong pellet cart was left in the area or was brought back into the area as of the date of the NRC inspection.)
- When the situation was reported during a production meeting on October 27, the Area Manager and staff engineers immediately recognized the problem as a criticality safety violation and ordered the pellets removed from the natural uranium cart.
- The Quality Control (QC) inspectors who had been handling the enriched pellets stated that they understood that enriched pellets were not to be placed in the natural pellet cart, and recognized their error when they were made aware of the problem.

As followup actions to the incident, the licensee held workplace meetings with QC inspectors, Pellet Area operators, and associated engineers and supervisors for all three shifts. They were re-instructed in the proper control and utilization of natural pellet carts. Also, a formal investigation team was established to review the incident, identify causes, and establish long-term corrective actions. This issues of the licensee's investigation of the incident, identification of the root cause and implementation of corrective actions to prevent recurrence of the problem was identified as a URI and will be reviewed during a future inspection (URI 70-1151/92-09-05).

5. Exit

The scope and results were summarized on October 29, 1992, with those persons indicated in Paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection results and observations. No dissenting comments were received from the licensee. Although proprietary material was reviewed and discussed during this inspection, proprietary information is not contained in this report.

<u>Item Number</u>	<u>Description and Reference</u>
70-1151/92-09-01	IFI - Followup on the documentation of general and specific controls to be used for MNFG containers (Paragraph 2).
70-1151/92-09-02	IFI - Followup on completion of the NSAs for high and low priority MNFG containers (Paragraph 2).
70-1151/92-09-03	IFI - Followup on complete implementation of the licensee's MNFG container control program (Paragraph 3).
70-1151/92-09-04	URI - Followup on inconsistent application of the licensee's area postings, use of MNFG containers for collecting trash, and storage of favorable geometry containers (Paragraph 3).
70-1151/92-09-05	URI - Followup on the licensee's investigation, identification of the root cause, and implementation of corrective actions following the October 27, 1992, incident involving enriched pellets being placed in a natural uranium pellet cart (Paragraph 4).