U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report No:	070-00036/99002(DNMS)
Licensee:	ABB Combustion Engineering, Inc.
Facility:	Hematite Nuclear Fuel Manufacturing Facility
Location:	3300 State Road P Festus, MO 63028
Dates:	April 26 - 30, 1999
Inspector:	Courtney A. Blanchard, Resident Inspector Portsmouth Gaseous Diffusion Plant John E. House, Senior Radiation Specialist
Approved By:	Patrick L. Hiland, Chief Fuel Cycle Branch Division of Nuclear Materials Safety

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EXECUTIVE SUMMARY

ABB Combustion Engineering, Inc.
Nuclear Fuel Manufacturing Facility
NRC Inspection Report 070-00036/99002(DNMS)

This routine, announced inspection included a review of aspects of licensed operations, training, radiation protection safety, environmental protection, and management organization and controls.

Plant Operations

- Operations observed during the inspection were generally conducted in accordance with the governing procedures. However, the inspectors identified a lack of integration between procedural guidance and labeling of the physical plant, which was resolved during the inspection. (Section O1.1)

- The inspectors identified a reduction of debris in the oxide plant and behind Building 253 which improved the plant staff's egress ability and reduced the area fire loading. The plant staff took timely corrective actions to reestablish a nuclear criticality safety passive administrative control. However, the loss of the control raised additional concerns regarding the configuration management of nuclear criticality controls. (Section O1.2)

Maintenance and Surveillance Activities

- The plant staff adequately responded to exhaust stack emission equipment failures. The plant staff took timely corrective action to incorporate sampling protocol for equipment abnormalities. (Section M2.1)

Plant Support

- The individual and collective dose rose in 1998 after decreasing during 1995-1997. The licensee believed the increase was due mainly to the increased production hours (overtime) necessary to meet the production contracts. The As-Low-As-Reasonably-Achievable Program appeared to be functional and no major problems were observed. (Section R1.1)

- The inspectors concluded that operations staff were properly using the lapel air monitors. (Section R1.2)

- The licensee continued to effectively implement the Radiation Protection Program in accordance with the license and facility procedures. The inspectors randomly observed and reviewed selected aspects of the licensee's Radiation Protection Program in the areas of laboratory quality assurance, contamination surveys, respiratory protection requirement postings, entry/exit into the controlled area and the laundry process. (Section R1.3)

- The licensee's liquid effluents were within the NRC release limits. No problems were observed with the laundry facility operations, and the licensee representatives were knowledgeable about the process. (Section R2.1)

- The inspectors concluded that the licensee's program for issuing visitors access to restricted areas was controlled in accordance with the licensee's license and Physical Security Plan. (Section S1.1)

- The biennial refresher training for Radiation Safety and Nuclear Criticality Safety Programs appeared to be thorough and included both theoretical and practical aspects of the programs. The examinations given after the training sessions, to check the general proficiency of workers allowed unescorted access to the restricted area, were challenging. (Section I1.1)

Report Details

I. Operations

O1 Conduct of Operations

O1.1 Facility Tours and General Operations

a. Inspection Scope (88020 and 88010)

The inspectors toured various plant areas and observed ongoing facility operations and the implementation of nuclear criticality safety (NCS) requirements included in procedures and on postings. In particular, the inspectors reviewed aspects of the implementation of the following procedures:

Operations Sheet 806.00, "Recycle/Recovery Area Wet Scrubber;"

Operations Sheet 845.00, "UO_4 Dryer and Scrubber Operations;" and

Operations Sheet 801.09, "Filter and Filter Media Storage."

b. Observations and Findings

The inspectors determined that operations observed were conducted safely and generally in accordance with the governing procedures. Procedure manuals were observed at numerous locations throughout the plant and minor updates (Temporary Shop Instructions) were posted near the applicable work locations. Check sheets and inventory logs used with specific procedures were completed and available in the immediate area of the operation.

The inspectors walked down Operating Sheet (OS) 806.00 with the Recycle and Recovery System Engineer and a cognizant operator. The inspectors noted that OS 806.00 provided instructions for operating the three caustic scrubbers for the dry recycle process. The OS required the operators to measure and adjust the scrubber solution to a hydrogen ion concentration (pH) level of eight or greater and record the data on a scrubber operating log sheet each shift. The operators were required to maintain the scrubber solution above a pH level of eight in order to effectively remove hydrogen fluoride from the off-gases of the recycle and recovery reduction furnaces. However, the inspectors noted that the scrubber operating log sheet did not note the acceptance criteria for the scrubber pH level or include a column to record the pH level after operators added caustic solution to adjust the scrubber solution.

As a followup, the inspectors reviewed scrubber operating log sheets and discussed the pH acceptance criteria with operators. The inspectors observed that between April 16 and 27, 1999, scrubber operating log sheets documented five consecutive pH readings below eight for Scrubbers No. 1 and 2. The inspectors discussed this issue with an operator who was not certain of the acceptable pH level for the scrubbers but immediately referenced OS 806.00 for the answer. In discussions with the inspectors, the Recycle and Recovery System Engineer explained that the operators were not required to record the adjusted pH level on the scrubber log sheet because a predetermined amount of caustic was added to the scrubber solution which was known

to adjust the pH level above eight. However, the Recycle and Recovery System Engineer stated that the scrubber operating log sheet would be revised to include a column for the adjusted pH level (as-left) and the acceptable limit for the pH solution level (eight or greater).

The inspectors discussed with the Recycle and Recovery System Engineer and three cognizant operators the operation of the uranium tetraoxide (UO_4) dryer and scrubber. The inspectors noted that OS 845.00 provided the instruction to start-up and operate the UO_4 dryer and scrubber. The startup and shutdown of the UO_4 scrubber required the manipulation of approximately 15 process valves. Operating Sheet 845.00 clearly articulated the manipulation of the valves by valve number and description. However, the inspectors observed that only a few of the valves were labeled. In a followup discussion with the inspectors, the three operators were not able to identify all the valves by the OS 845.00 description. Specifically, the operators could not readily distinguish between the steam jacket and screw supply lines. The inspectors observed that the piping configuration for steam jacket and screw supply lines were identical and were not labeled. In addition, the inspectors observed that OS 845.00 required the operator to regulate the screw steam pressure to 60 pounds per square inch (psig) but the pressure gauge range was limited to 35 psig. In discussion with the inspectors, the Recycle and Recovery System Engineer stated that stainless steel engraved valve labels were purchased after the inspectors noted the label issue during the March 5, 1999, inspection; however, the labels had not been installed. The inspectors noted that all the recycle and recovery system valves were labeled at the conclusion of the inspection and that the Recycle and Recovery System Engineer had prepared a maintenance request to install the appropriate screw steam pressure gauge.

During a walk down of OS 801.09, the inspectors identified an issue with the storage of filters. Operations Sheet 801.09 required the 12-inch by 24-inch filters to have a net weight of less than 1 kilogram (Kg) or a gamma count of less than 37 grams of uranium-235 (U-235); and required the 24-inch by 24-inch filters to have a net weight less than 2 Kg or a gamma count of less than 75 grams of U-235. In discussion with the inspectors, a cognizant operator did not know there was a different acceptable weight limit for the two types of filters. The inspectors noted that the posting for the filter storage area and the continuous U-235 inventory log did not address any uranium weight limits for individual filters but addressed the filter stack limits, the special nuclear material (SNM) U-235 content limits, and the required separation between adjacent SNM. In addition, the inspectors observed that the continuous U-235 inventory log for one stack of filters was not the current revision and had different control limits. Specifically, Revision 3 limited the U-235 filter storage media weight content to 350 grams and Revision 5 limited the weight content to 700 grams. The inspectors noted that operators and first line management had attested that a total of 691 grams of U-235 were logged on the incorrect revision of the continuous U-235 inventory log which limited the U-235 weight to 350 grams. In response to the inspectors concerns, the first line manager removed all copies of Revision 3 to the continuous U-235 inventory log and management performed a stand down with operators focusing on attention to detail.

c. Conclusions

Operations observed during the inspection were generally conducted in accordance with the governing procedures. However, the inspectors identified a lack of integration between procedural guidance and labeling of the physical plant, which was resolved during the inspection.

O2 Operational Status of Facilities and Equipment

O2.1 Facility Tours and Observation of Equipment

a. Inspection Scope (88020)

The inspectors performed several facility tours to observe general housekeeping, implementation of required NCS postings and controls, emergency egress routes, and operation of high efficiency particulate air (HEPA) filters.

b. Observation and Findings

During a facility walkdown, the inspectors noted that general housekeeping had improved. Specifically, the plant staff had removed spare equipment from the uranium hexafluoride (UF_6) oxide conversion plant, shipped a majority of the contaminated soil containers filled as a part of the remediation efforts for the former evaporation ponds, and disposed of debris from behind Building 253; all were noted concerns in previous NRC inspection reports.

The inspectors noted the location and accuracy of postings. Posting of criticality limits and controls appeared consistent with Section 4.1.5, "Posting of Limits and Control," and Section 2.4, "Criticality Safety Limits and Signs," of the license application and with Nuclear Industrial Safety Procedure No. 201, "Nuclear Safety Manual." The inspectors observed that the current NRC Form 3 was posted at all portals and on every bulletin board throughout the production plants.

On April 22, the inspectors noted that fissile material storage areas in Building 253, the Red Room, and the Pellet Plant were not marked in accordance with guidance in OS 201.00, "Nuclear Safety Parameters." Operating Sheet 201.00 required that the plant staff mark the perimeter of array storage areas with yellow lines. In discussions with the inspectors, plant management explained that the plant staff failed to reapply all the yellow lines after painting the floors approximately a month before the inspection. The inspectors observed adequate spacing between the unmarked array storage areas and all adjacent SNM throughout the process buildings. In addition, the inspectors noted that all the array storage area postings addressed the 1 foot separation requirement and operators questioned were cognizant of the 1 foot separation requirement between SNM. On the morning of April 23, the inspectors noted that all of the array storage areas were marked in accordance with OS 201.00. In addition, plant management stated that administrative controls would be implemented to ensure required markings were addressed during painting evolutions. The failure to adequately mark the parameters of the array storage areas constitutes a violation of minor significance and is not subject to formal enforcement action.

The inspectors noted that while the unmarked array storage areas had minor safety significance, a concern with the control of configuration management was identified. In addition to the lack of management controls to ensure that required postings were reestablished after maintenance, as identified in the preceding paragraph, on August 6, 1999, the plant staff issued a NRC Bulletin 91-01 report to the NRC that identified a loss of a criticality control for the incinerator. The incinerator had accumulated as much as 325 grams of uranium in the vent system. As a followup to the incinerator vent system report, the inspectors noted that the plant staff had removed a procedural requirement to visually inspect the incinerator vent system for uranium accumulations from OS 861.00, "Incinerator Cleanout," the applicable procedure. The inspectors noted that OS 861.00 was revised on October 22, 1998, to reestablish the visual inspection of the incinerator vent system. The licensee's plan to address the apparent adverse trend in configuration control will be tracked as an **Inspection Followup Item (IFI 70-00036/99002-01).**

The inspectors observed the emergency egress routes, and pressure differentials across the HEPA filters. The inspectors observed that hallways, stairways, and paths were clear of obstacles for egress out of the production plants. Additionally, the inspectors observed that the differential pressure was below 6 inches of water across the HEPA filters.

c. Conclusions

The inspectors identified a reduction of debris in the oxide plant and behind Building 253 which improved the plant staff's egress ability and reduced the area fire loading. The plant staff took timely corrective actions to reestablish a nuclear criticality safety passive administrative control. However, the loss of the control raised additional concerns regarding the configuration management of nuclear criticality controls.

O8 Miscellaneous Operations Issues

O8.1 (Closed) VIO 070-00035/99001-02: Failure to establish a program for the testing, calibration, and inspection of the cold trap system. The inspectors identified that the plant staff failed to calibrate the cold trap system as required by the integrated safety assessment/hazard analysis. The failure to calibrate the system resulted in an increased risk of having the safety interlock system fail and could have resulted in a catastrophic rupture of the cold trap 8A cylinder during heating. As initial followup, the inspectors noted that the plant staff's immediate operability actions were adequate.

The inspectors reviewed the plant staff's program to calibrate and maintain the cold trap system. The inspectors noted that the plant staff disassembled, cleaned, and rebuilt the cold trap system. In discussion with the plant staff, the inspectors learned that the system load monitor was replaced and records indicated the 8A cold trap weight interlock was tested for operability. The results of the 8A cold trap weight interlock test identified that the system isolated at the required 100 kilograms (kg). Through direct observation, the inspectors observed that the 8A cold trap system local and control room scales displayed zero when the system was empty. In addition, inspectors observed the plant staff add two 25 kgs weights to the cold trap scale on April 28. The cold trap system was in operation during the test and displayed 31.55 kgs at both the local and control room scales before the weights were added. When one 25 kg weight was added to the cold trap system that contained 31.55 kgs of UF_6, the scales displayed

56.25 kgs; and when the second 25 kg weight was added, the scales displayed 81.45 kgs, which was within the 10 kg error allowed in OS 4101.00, "Oxide Inspection and Alarm Calibration." The inspectors noted that the plant staff revised OS 4101.00 to include the inspection, calibration and testing to ensure that the cold trap system operating parameters were maintained and tested as required by the integrated safety assessment/hazard analysis. The inspectors concluded that the plant staff's corrective actions were reasonable and considered the violation closed.

II. Maintenance

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Maintenance of Exhaust Stack Sampling

a. Inspection Scope (88005 and 88045)

The inspectors reviewed selected elements of the exhaust stack sampling program with respect to management controls and program implementation. The specific document reviewed was Health Physics (HP) Procedure 301.0, "Exhaust Stack Sampling."

b. Observations and Findings

The inspectors reviewed HP 301.0, which defined the sampling practices used to evaluate the uranium concentration in the gaseous effluents from stack emissions. Records indicated that the plant staff typically collected the air samples on Fridays and performed sample analysis on Saturdays. The delay in performing the sample analysis was to allow the radon in the sample to decay. The inspectors reviewed several years of monthly sample results and noted no significant changes in emission quantities between months, except during plant outages. During plant outages, the stack emissions would decrease. In addition, the inspectors learned that the plant staff would assign the average weekly emission quantity from the previous month to a week in which a pump was inoperable. However, this method used to assign weekly emission quantities for a week when a sample pump was inoperable was not included in HP 301.0. As a followup, the inspectors noted that the plant staff was finalizing an HP 301.0 revision which included addressing the method used to assign weekly emission quantities when sample equipment was inoperable.

The inspectors reviewed the plant staff's maintenance practice for repairing inoperable stack emission equipment. The plant staff continuously sampled 19 stacks. The sampling equipment draws a specified quantity of air from the stack through a filter medium. The sampling equipment included an air pump to draw the discharging air from the stack. In discussions with the inspectors, the plant staff explained that the emission stack sampling component with the highest failure rate was the air pump. To expedite failed pump replacement, the plant staff had four spare pumps and had ordered four additional new pumps. The inspectors determined that failed pumps were replaced by HP technicians and the pumps were repaired by maintenance. The inspectors identified no adverse trend in the pump failure rate and maintenance records indicated that pumps required replacement every 2 to 3 years.

c. Conclusions

The inspectors concluded that the plant staff adequately responded to exhaust stack emission equipment failures. The plant staff took timely corrective action to incorporate sampling protocol for equipment abnormalities.

III. Plant Support

R1 Conduct of Radiation Protection Activities

R1.1 As-Low-As-Reasonably-Achievable (IP 83822)

a. Inspection Scope

The As-Low-As-Reasonably-Achievable (ALARA) Policy was defined in Section 3.1.1 of the license. The inspectors reviewed the 1998 ALARA Plan and the exposure results for 1998.

b. Observations and Findings

The main exposure pathway at the plant was through the inhalation of airborne uranium, primarily Class Y uranium oxide powder or dust (internal dose). The licensee monitored worker intakes by using lapel air samplers for all plant personnel and contractors who worked in the contamination control area. The licensee calculated worker dose by utilizing the lapel air sample results to calculate the derived air concentration-hours (DAC-hours) for each worker on a shiftly basis. This data was then converted to a dose in one thousandth (10-3) roentgen-equivalent-man (rem) which was the Committed Effective Dose Equivalent (CEDE). The external or deep dose equivalent (DDE) from the worker's film badge was added to the internal result to obtain the total effective dose equivalent (TEDE) for each worker.

Year	Individual High Dose (rem)	Average Top 10 Worker Dose (rem)	Collective Dose TEDE (person-rem)
1995	2.6	2.4	162
1996	2.5	2.2	131
1997	2.5	2.2	114
1998	3.5	2.8	138

All doses in the table above were TEDE.

The licensee had reduced the collective TEDE for the facility from 1995 to1997. The individual high dose and the average top ten worker dose dropped from 1995 to1996 and was relatively constant between1996 and 1997. All of these areas increased for 1998; however, during 1998, no worker exceeded the NRC maximum of 5 rem or the licensee's administrative limit of 4 rem per year. Discussions with licensee representatives and a review of dose and production records indicated that increased production along with higher enrichment (U-235) fuel material accounted for part of the increase. The individual high dose was approximately one rem higher from 1997 to 1998, an increase of approximately 40 percent. The average of the top ten worker dose went from 2.2 rem to 2.8 rem from 1997 to 1998 which represented an increase of

approximately 27 percent. The collective dose for all workers rose from 114 rem to 138 rem, an increase of approximately 21 percent. The licensee achieved the 1998 ALARA dose goal for collective TEDE of 140 person-rem but did not achieve the 2.0 rem goal for average individual dose. Nineteen workers were over this goal.

Discussions with licensee representatives indicated that several factors were responsible for the increased dose for 1998. These were:

1) Production increased in 1998;

2) Enrichment was increased from August 1998 to February 1999. This resulted in increased specific activity which translated into higher dose;

3) There was less job rotation during 1998 because of an increased production schedule and workers performed those jobs for which they were most adept;

4) The licensee does not practice dose equalization. Workers performing higher dose rate jobs would have increased dose for the year (1998); and

5) Graphs of two production areas (ERBIA and Recycle Recovery) showed that DAC-hours/day increased during 1998. Both lapel and fixed samplers demonstrated the increase.

The licensee believed that the dose will drop in 1999 as a result of normal plant outages.

Dose assignment was conservative as evidenced by not taking credit for particle size analysis. A licensee representative stated that credit for particle size analysis would reduce the calculated internal CEDE dose. There was no linkage of dose to worker overtime eligibility which could result in workers turning off their lapel samplers if they were approaching an administrative dose limit that would prohibit them from working overtime. Elimination of this practice is a positive ALARA step as it results in more accurate dose estimates for workers.

Deep dose equivalent was measured using film badges or thermoluminescent dosimeters. The DDE is a much smaller component of the TEDE, resulting from workers being in close proximity to the fuel bundles, the major source of gamma radiation in the facility. The DDE of approximately 18 person-rem met the 1998 ALARA goal of 25 person-rem. The licensee has taken steps to reduce this component of total dose by limiting the number of finished fuel assemblies in the fuel bundle storage and inspection areas, and minimizing worker stay-time in these areas.

c. Conclusions

The individual and collective dose rose in 1998 after decreasing during 1995-1997. The licensee believed the increase was due mainly to the increased production hours (overtime) necessary to meet the production contracts. The As-Low-As-Reasonably-Achievable Program appeared to be functional and no major problems were observed.

R1.2 Lapel Air Sampling Program

a. Inspection Scope (83822)

The inspectors reviewed the lapel air sampling program, and observed and interviewed operations staff at various work stations to evaluate the effectiveness of the lapel air monitoring program in the restricted areas of the plant.

Specific procedures and documents reviewed were:

Health Physics Procedure No. 303, "Lapel Air Sampling," Revision 3, dated August 12, 1998; and

Operation Safety Procedure No. 202, "Health Physics Controls," Revision 0, dated February 18, 1987.

b. Observation and Findings

The licensee monitored internal dose by using lapel air samplers for all plant staff and contractors who worked in the contamination control area for periods longer than 8 hours per week or 2 hours per day. The sampling area of the lapel air samplers was considered representative of the breathing zone. Dose to the worker was calculated from the activity on the sampler filter.

During the inspection, the inspectors interviewed plant staff and observed that workers were properly wearing the lapel air monitors per HP Procedure No.303, "Lapel Air Sampling." The sample heads of the lapel air samplers were clipped to the workers' lapels on the outside of the smocks or coveralls, were properly positioned in the breathing zone, and were turned on. The workers appeared to understand their responsibilities for operation of the samplers. Each worker was assigned a sampler. The lapel air sampler calibration period was 6 months and the samplers observed were within the calibration period.

c. Conclusions

The inspectors concluded that plant staff were properly using the lapel air monitors.

R1.3 Observation of Routine Radiation Protection Activities

a. Inspection Scope (83822)

Selected parts of the laboratory Quality Assurance (QA) Program were reviewed including counting instrument quality control records. Health physics technicians (HPTs) were observed performing smear surveys, and worker radiological practices at the change out area were observed. The laundry process was also reviewed. Specific procedures reviewed were:

Health Physics Procedure No. 322, "Alpha/Beta Proportional Counter Calibration," Revision 4, dated September 24, 1996;

Health Physics Procedure No. 307, "Performing Smear Surveys," Revision 3;

Operation Safety Procedure No. 202, "Health Physics Controls," Revision 0; and

Health Physics Procedure No. 309, "Survey of Items for Release," Revision 5.

b. Observations and Findings

The inspectors reviewed selected portions of the QA program for the Alpha/Beta proportional counters. Instrument calibration, including voltage plateau testing along with the efficiency calculation, had been performed as required and the instruments were within the calibration period. No problems were noted.

The inspectors reviewed and observed the performance of routine contamination smear surveys in the plant during the course of the inspection. During facility tours and accompaniments with HPTs during the inspection, the inspectors noted that the controlled area was properly posted, as were areas requiring postings for airborne radioactivity which required the use of respiratory protection. The inspectors noted no concerns with the conduct of the radiation protection activities observed.

Activities in the change room were observed while workers were entering and leaving the restricted area. The workers donned and removed protective clothing properly, and performed the appropriate survey/frisks. No extraneous material such as newspapers was observed being taken into or out of the restricted area. Radiological survey instrumentation that was used for frisking prior to exiting the plant restricted area satisfied the required calibration frequency. Observations of employee practices for performing self-monitoring indicated that radiological training appeared adequate in the use of radiation detection equipment.

The laundry facility was toured and the process was reviewed (see Section R2.1 for Liquid Effluents) with licensee representatives. The laundry facility was located in a clean area of the plant. Contaminated clothing from the restricted area was transported to the facility in uncovered containers. The inspectors noted to the licensee that this was not a good contamination control practice. A licensee representative stated that this practice would be reviewed. The inspectors also noted that the finished clothing was not surveyed prior to being returned for use. Licensee representatives stated that since hot particles were not a problem in the production of fuel, and that fuel pellets were not found in the pockets of contaminated garments, surveying the washed garments was unnecessary. The inspectors had no further concerns.

c. Conclusions

The licensee continued to effectively implement the Radiation Protection Program in accordance with the license and facility procedures. The inspectors randomly observed and reviewed selected aspects of the licensee's Radiation Protection Program in the areas of laboratory QA, contamination surveys, respiratory protection requirement postings, entry/exit into the controlled area, the laundry process, and did not identify any unresolved concerns.

R2 Environmental Monitoring

R2.1 Liquid Effluents

a. Inspection Scope (88035)

The inspectors reviewed the laundry processing system, including water flow from the laundry, through the sanitary treatment plant to the outfall, and reviewed selected data from the licensee's effluent monitoring reports.

b. Observations and Findings

Waste water from the laundry process was mixed with a polymer and pumped through a filter press to a holding tank. The filter press cake was incinerated in the recycle recovery process. The tank was sampled daily by the HP group. From the holding tank, the laundry process water goes to the sanitary treatment plant along with site sewage. The treatment plant effluent, plus water from storm drains, ultimately flows into the Joachim Creek. Sludge from the sewage treatment plant was mixed with polymer and dewatered in a filter press. The solid was shipped to a vendor for offsite burial. Effluent release data was reviewed from sampling areas 2 (Joachim Creek-upstream), 3 (Joachim Creek-confluence) and 4 (Joachim Creek-downstream). All sample activity met the release criteria contained in 10 CFR 20, Appendix B, Table 2 for liquid effluents.

c. Conclusions

The licensee's liquid effluents were within the NRC release limits. No problems were observed with the laundry facility operations, and the licensee representatives were knowledgeable about the process.

S1 Conduct of Security and Safeguard Activities

S1.1 Process Building Access Review

a. Inspection Scope (88005)

The inspectors reviewed access controls for visitors to restricted areas.

b. Observations and Findings

The inspectors reviewed selected requirements of Procedure OS 7002.00, "Security and Film Badging." Specifically, the inspectors reviewed the rigor imposed to visitors for access to restricted areas. The inspectors reviewed the training records of five contractors who recently had access to restricted areas within the process plant. The inspectors identified that the five contractors had received the mandatory indoctrination training required by the Section 2.5, "Training," of the license application. However, the inspectors identified that one of the five contractors was issued a red rather than a yellow badge, which required the licensee to escort this contractor per Procedure OS 7002.00. In discussion with the inspectors, the Regulatory Affairs Manager explained that the contractors received yellow badges (no escort required in restricted areas) only after the Regulatory Affairs Manager felt confident that the contractor was knowledgeable of the plant in all respects.

c. Conclusions

The inspectors concluded that the licensee's program for issuing visitors access to restricted areas was controlled in accordance with the licensee's license and Physical Security Plan.

I1 Conduct of Training Activities

I1.1 Facility Indoctrination and Refresher Training

a. Inspection Scope (88010)

The inspectors reviewed the licensee's general employee training to verify that the training addressed the requirements of 10 CFR 19.12, "Instruction to Workers," and Section 2.5, "Training," of the license.

b. Observations and Findings

The inspectors reviewed the general employee training courses; discussed course content with licensee trainers; reviewed the course overview, course objectives, and course material; and reviewed the exam administrated to workers upon completion of the required courses. This training was required to allow an employee unescorted access to the controlled area. The inspectors noted that the general employee training included NCS, radiological safety, and emergency training.

The inspectors verified that the training included the required regulatory and license topics, including:

- the storage, transfer, and use of special nuclear material;
- the nuclear criticality controls used throughout the production facilities;
- the health risks associated with exposure to radiation and radioactive material;
- precautions and procedures to minimize exposure;
- the purposes and functions of personnel protective equipment;
- NRC regulations regarding the protection of personnel from exposure to radiation and radioactive material;
- the responsibilities of site workers to immediately report to the licensee any condition which may lead to or cause a violation of NRC regulations;
- the appropriate responses to warnings and alarms made in the event of an unusual occurrence that may involve exposure to radiation and radioactive material, and an illustration of evacuation routes through or around the site buildings;

- NRC Forms 3, 4, and 5; and
- general NCS principles.

Section 2.5, "Training," of the license required employees to receive the above training prior to access to the controlled area and every 2 years after the initial training for unescorted access to a controlled area. In addition, operating personnel were required to receive a refresher course in nuclear criticality control and radiation safety on a biennial basis. The inspectors noted that the nuclear criticality control and radiation safety refresher training was similar to the training given to new employees. In addition, the inspectors noted that the examinations were challenging and focused on requirements pertinent to routine operations in the plant. A score of at least 80 percent was required to pass the examinations. Remedial training was provided for those workers who did not pass the examination. A review of the curricula and examinations indicated that the training covered both theoretical and practical aspects of radiation safety and NCS.

The inspectors examined the licensee's method to manage employee training. The inspectors noted that the licensee used a computer-based data management system to track employee training and restrict access to process equipment. The computer-based data management system interfaces with major process equipment throughout the process buildings except for the recycle and recovery process. At the beginning of each shift, the employee logged into the process equipment they intend to operate. If an employee allowed any required training to lapse, the computer based data management system would not allow access into the process work station.

c. Conclusions

The biennial refresher training for Radiation Safety and NCS Programs appeared to be thorough and included both theoretical and practical aspects of the programs. The examinations given after the training sessions, to check the general proficiency of workers allowed unescorted access to the restricted area, were challenging.

IV. Management Meetings

X1 Exit Meeting Summary

The inspectors met with plant management and other staff throughout the inspection and on April 30, 1999, for the exit meeting. The inspectors summarized the observations and findings of the inspection. The licensee management acknowledged the findings. The licensee did not identify any of the information discussed at the meetings as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Eastburn, Nuclear Criticality Specialist
K. Funke, Supervisor Health Physics
K. Hayes, Industrial Safety Engineer
D. Rohde, Technical Trainer
E. Saito, Health Physicist
B. Sharkey, Director of Regulatory Affairs
P. Weaver, Production Manager

INSPECTION PROCEDURES USED

IP 83822:	Radiation Protection
IP 88005:	Management Organization and Controls
IP 88010:	Operator Training/Retraining
IP 88020:	Operations Review/Regional Criticality Safety
IP 88035:	Radioactive Waste Management
IP 88045:	Environmental Protection

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

070-00036/99002-01 IFI	Control of configuration management.

Closed

070-00036/99001-02 VIO	Failure to establish a program for the testing, calibration, and inspection of the cold trap system.

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
DAC-hours	Derived Air Concentration-Hours
DDE	Deep Dose Equivalent
DNMS	Division of Nuclear Materials Safety
HEPA	High Efficiency Particulate Air
HP	Health Physics
HPT	Health Physics Technician
IFI	Inspector Followup item
kg	kilogram
NCS	Nuclear Criticality Safety
NRC	Nuclear Regulatory Commission
OS	Operation Sheet
PDR	Public Document Room
pH	hydrogen ion concentration
psig	pounds per square inch
QA	Quality Assurance
rem	roentgen-equivalent-man
SNM	Special Nuclear Material
TEDE	Total Effective Dose Equivalent
U-235	uranium-235
UF_6	uranium hexafluoride
UO_4	uranium tetraoxide
VIO	Violation