



August 17, 1990

Docket No. 70-1100

License No. SNM-1067

Dr. Ronald R. Bellamy, Chief
Facilities Radiological Safety
and Safeguards Branch
Division of Radiation Safety
and Safeguards
U. S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, Pennsylvania 19406

Subject: Response to Notice of Violation (Inspection
Report No. 70-1100/90-05)

Reference: Letter, R. R. Bellamy (NRC) to C. R. Waterman
(C-E), dated July 20, 1990

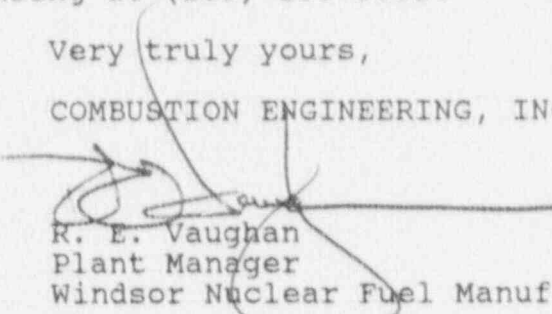
Dear Dr. Bellamy:

Combustion Engineering has reviewed the Notice of Violation
received with the Reference letter, and our reply is
provided herewith (Enclosure).

If I can be of further assistance on this matter, please do
not hesitate to call me or Mr. J. F. Conant, Manager,
Nuclear Materials Licensing at (203) 285-5002.

Very truly yours,

COMBUSTION ENGINEERING, INC.



R. E. Vaughan
Plant Manager
Windsor Nuclear Fuel Manufacturing

REV:nlv

cc: J. Roth (NRC - Region I)
S. Soong (NRC)

ABB Combustion Engineering Nuclear Power

Combustion Engineering, Inc.

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RESPONSE TO NOTICE OF VIOLATION
(NRC INSPECTION REPORT NO. 70-1100/90-05)

Statement of Violation A:

Section 4.1.5, "Internal Review Requirements," of Part 1, Criteria, of the NRC-approved license application for License No. SNM-1067 states, in part, that all process/equipment/facility changes which affect nuclear criticality safety shall be reviewed and approved in writing.

Contrary to the above, between April 6 and June 7, 1990, a process/equipment/facility change, which involved the addition of foam rubber and wooden blocks to the fluoroscope unit rack to support uranium containing fuel rods, was made and was not reviewed and approved in writing. This change could affect the nuclear criticality safety of the fluoroscope unit.

Response:

Upon notification by the NRC Inspector of the subject violation, an immediate inspection of the fluoroscope inspection in-feed table determined that no unauthorized hydrogenous materials were present. Additionally, an Abnormal Event/Occurrence (AEO) Report was initiated in accordance with NFM procedures, and an investigation was conducted. The investigation revealed that foam rubber strips had been used in the past during fabrication campaigns of certain shorter type fuel rods to support the ends of short rods on the in-feed table. During the months of February and March, 1990, foam rubber strips were used but these were replaced, at the direction of the the Inspection Supervisor with wooden blocks on March 12, 1990. On March 13, 1990, in response to an employee complaint about the usefulness of the foam pads or wooden blocks, both methods of support (foam rubber pads or wooden blocks) were disposed of, and a permanent modification of the in-feed table using steel rails was initiated by the Inspection Supervisor. Use of foam rubber or wood blocks was discontinued on March 13, 1990. The Inspection Supervisor did not recognize the potential criticality interaction of having used hydrogenous material nor did he properly initiate the required reviews when the steel supports were added to the table. On April 6, 1990, the General Supervisor of Inspection learned of an employee concern about an unauthorized modification to the fluoroscope in-feed table. He initiated a Change/Modification Request (CMR) to document appropriate reviews and to get approval for the steel support rail modification. The General Supervisor of Inspection believed that this CMR satisfied NFM requirements and the concern of the employee.

Concurrently with initiation of an AEO Report and the associated investigation, the Plant Manager requested a criticality safety evaluation by the Nuclear Criticality Specialist of the conditions which resulted from the use of foam rubber pads or wooden blocks on the fluoroscope in-feed table.

Following an inspection and review by the Nuclear Criticality Specialist and Senior Criticality Specialist of the hydrogenous materials used at the fluoroscope table, it was concluded that prior analysis of the fluoroscope inspection in-feed table was based on a safe slab geometry and assumed optimal moderation and full reflection conditions. Thus the unauthorized use of foam rubber pads or wooden blocks did not result in unsafe or unanalyzed conditions with respect to criticality safety.

The following actions have been taken to correct this Violation and to ensure that such a situation does not recur:

1. Review and approval of the CMR covering the permanent steel rail modifications were completed.
2. Other NFM facility equipment was inspected for unauthorized changes. None were found.
3. Training was held for all Inspection and Manufacturing Operators, Radiological Protection Technicians, Production and Inspection Supervisors and Operations Shift Supervisors. This training included a detailed critique of the incident that led to this violation and emphasized, in addition to topics discussed below, the license and internal procedure requirements for formal review and written approval of any process/equipment/facility changes that could affect criticality safety. All personnel were instructed on their obligation to use the CMR system to fulfill this requirement.

Combustion Engineering, Inc. believes that the above actions, which have been completed, will preclude recurrence of the cited violation.

Statement of Violation B:

Section 2.8, "Investigations and Reporting," of Part 1, Criteria, of the NRC-approved license application for License No. SNM-1067 states, in part, that abnormal occurrences are investigated in accordance with written procedures and reported to the Plant Manager. The procedure written pursuant to the above is AP-1, Revision 0, "Abnormal Event/Occurrence Reporting Procedure."

Contrary to the above, on April 6, 1990, the placement and use of foam rubber or wood blocks on the fluoroscope unit was reported as an abnormal occurrence and was not investigated and reported to the Plant Manager in accordance with written Procedure AP-1, Revision 0.

Response:

This violation resulted from the events surrounding Violation A discussed above. The corrective action taken includes that described above. When notified of this violation, the following actions were taken:

A formal Abnormal Event Occurrence (AEO) report was prepared in accordance with AP-1. The incident was fully investigated by the Operations Shift Supervisor; root causes were determined and their identification approved in writing by the AEO Committee; and corrective actions were assigned to responsible personnel and approved by the AEO Committee, upon completion, per AP-1. This corrective action included:

1. The Plant Manager requested a formal review and criticality evaluation of the incident. This review and evaluation was performed by the Nuclear Criticality Specialist and reviewed by the Senior Criticality Specialist. It was concluded and reported in writing that the foam rubber or wooden blocks as used on the fluoroscope in-feed table had not compromised criticality safety.
2. The Plant Manager issued a note in the Plan of the Week re-emphasizing the requirement for approval by CMR of all facility changes and modifications to processes or equipment.
3. As discussed above, the CMR review of the permanent (steel rail) modification to the fluoroscope in-feed table was completed with a determination that the change does not affect criticality safety limits in effect.
4. The training discussed in response to Violation A was accomplished. This training also included a review of the nature, causes and possible consequences of a criticality accident. Examples of moderating materials were described and the influence these materials have in causing critical conditions was discussed.

5. The need to pursue such occurrences using the AEO procedure to determine root cause and implement appropriate corrective actions was also emphasized during the training sessions.

Combustion Engineering, Inc. believes that the above actions, which have been completed, will preclude recurrence of the cited violation.

Statement of Violation C:

Section 3.2.3, "Ventilation Requirements," of Part 1, Criteria, of the NRC-approved license application for License No. SNM-1067 states, in part, that when the face velocity at a ventilated hood drops below 100 feet per minute (fpm), the hood filters or ventilation system filter will be changed, brushed, or knocked down to increase the air flow to 100 fpm minimum or the hood shall not be used to handle radioactive material.

Contrary to the above, on June 7 and 8, the face velocities of the two hoods located in the Building 5 Ceramics Laboratory were below 100 fpm (50 to 80), the hood or ventilation system filter(s) were not changed, brushed or knocked down, and the hoods continued to be used to handle radioactive material.

Response:

C-E has reviewed the circumstances surrounding this apparent violation and the following was determined.

On the afternoon of June 7, 1990, the NRC inspector contacted the Radiological Protection (RP) Technician on duty in Building 5 and requested entry to inspect the Ceramics Laboratory. There were no other persons in the Ceramics Laboratory and there was no work in progress. After entering the Ceramics Laboratory, the inspector requested the RP Technician take hood face velocity measurements at two hoods (Nos. 6 and 7/8) located in the Ceramics Laboratory. Although there was no work in progress, a small container with about six depleted uranium pellets was stored in Hood No. 6. As indicated in the inspection report the inspector had observed a velometer located in a small bracket inside Hood No. 6. The velometer is available for use by operators who normally confirm face velocity before starting work in the hood. The velometer is merely stored in the bracket and will not accurately indicate face velocity while in the bracket. The inspector fully opened the roll-up door on Hood No. 6 and requested airflow measurements of hood face velocity. The RP Technician advised the inspector that the hood was not used with the door in the full open position as further indicated by a hand lettered instruction taped to the face of the plastic door which stated "Operate at 1/2 open max only." As requested, the RP Technician did obtain a velometer reading with the hood door in the full open position and this reading was less than 100 fpm (about 50-80 fpm). After obtaining the reading with the door in the full open position, the RP Technician returned the door to the partially opened position (about 1/4 to 1/2 open). The inspector then requested velometer readings at Hood 7/8. The RP Technician advised the inspector that Hood 7/8 had not been used for any purpose in the recent past but monthly airflow readings were still being maintained. At the time of the inspection Hood 7/8 was equipped with three plastic sliding doors; one of these doors had fallen out of the upper slider track and was leaning into the hood. At the request of

the inspector a velometer reading was obtained at the face of Hood 7/8. During the investigation the RP Technician stated that the face velocity reading was significantly above 100 fpm; in fact, the reading was obtained on the high range scale of the velometer.

Following the below-specification reading at the face of Hood No. 6 with the door fully open the RP Technician placed a piece of masking tape across the front of Hood No. 6 and annotated it with instructions to the effect that the hood was not to be used. On June 7, 1990, he also requested the Maintenance Group replace the air filter associated with the hood. Prior to replacement of filters, additional velocity measurements for Hood No. 6 with the door 1/4, 1/2 and 3/4 open were found to be satisfactory.

When the inspector returned to the Ceramics Laboratory on June 8, 1990, neither hood had been used. The depleted uranium pellets remained in Hood No. 6 but were not handled or used for any procedures in the hood where they had been stored. On June 8, 1990, the Plant Manager was informed of the apparent violation and he initiated the following actions:

1. The condition of Hood No. 6 and the face velocities associated with it were checked by the Operations Shift Supervisor. He confirmed that with the roll-up door fully open, face velocity was below 100 fpm. He also established that face velocity exceeded the minimum specification of 100 fpm for door positions at 3/4, 1/2 and 1/4 open. He observed the hand lettered instruction that indicated "Operate at 1/2 open max only" was taped to the face of the hood (this instruction was in place since 1988). He also observed the RP Technician's instruction from the previous day, stating, "Do Not Operate RP" taped to the face of Hood No. 6. He directed that the taped instructions not to operate be replaced by a formal tagout. He also requested the Supervisor, Radiological Protection coordinate the filter change by Maintenance, which had been requested by the RP Technician the previous day.
2. Hood No. 6 and Hood 7/8 were formally tagged out. Hood 7/8 was included in the tagout since a filter change would affect both hoods.
3. It was verified that velometer readings at the hoods were being taken at monthly intervals as required by License No. SNM-1067. The previously recorded face velocity readings were taken on May 21, 1990. Face velocities were greater than 100 fpm at that time for all positions of the door including full open.
4. Upon preparing to change filters, Maintenance personnel noted that the Ceramics Laboratory was unusually warm. They also did not believe the exhaust line absolute filters to be the cause of low air flow. The filters in the ventilation lines supplying air to

the Ceramics Laboratory were then checked, found to be clogged and changed. Face velocities at both hoods were rechecked and verified to exceed 100 fpm with the door fully open on Hood No. 6 and normal door position for Hood 7/8. The tags were cleared and the hoods were returned to service on June 12, 1990.

5. The taped instruction on the roll-up door of Hood No. 6 was replaced with an engraved sign which states "OPERATE WITH DOOR AT MAX OPEN SCRIBE MARK. EXCEPTIONS TO BE MADE BY RP ONLY." Additionally an engraved sign marking the 1/4 open position has been installed at the side of the hood. Additionally, a pin has been installed above the roll-up door to prevent inadvertently opening the door beyond the 1/4 open scribe mark.
6. The sliding door on Hood 7/8 was reinstalled in its track. Additionally, a fourth plastic door has been installed in the same track as one of the other three doors thus ensuring only one door width can be achieved if this hood is used. Low face velocity has never been a problem with this hood.
7. The RP Technician assigned to Building 5 was instructed by the Supervisor, Radiological Protection on license requirements governing hood face velocities. The RP Technician was fully aware of the required airflow face velocity requirements. The Supervisor, Radiological Protection also directed the RP Technician to promptly report to the Supervisor, Radiological Protection any circumstance where hood face velocity is measured at or below an action limit. Additionally, he was instructed that the formal Tag Out System is to be used to take a hood out of service if face velocity falls below the minimum specification.

Combustion Engineering, Inc. believes that, because the hoods were not in use and no enriched Special Nuclear Material (SNM) was handled in them, that no violation occurred; face velocities were also measured to be above the minimum specification for normal door positions during hood operations. Further, actions taken to preclude use of the hood as soon as a low face velocity was found were adequate and timely. Furthermore, the request to Maintenance to replace filters and subsequent corrective actions by Maintenance were timely. We also believe that the additional actions described above will minimize the possibility of future low face velocities.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

JUL 20 1990

Docket No. 70-1100

Combustion Engineering, Inc.
ATTN: Mr. C. R. Waterman
Acting Vice President - Nuclear Fuel
Nuclear Power Systems
1000 Prospect Hill Road
Windsor, Connecticut 06095-0500

Gentlemen:

Subject: NRC Region I Inspection Report 70-1100/90-05

This refers to the routine safety inspection conducted by Mr. J. Roth of this office on June 4-8, 1990, for the purpose of reviewing your manufacturing operations, management controls, transportation, emergency planning, fire protection and actions taken to correct previously identified enforcement/open items, and to discussions of our findings held by Mr. Roth with Mr. R. Vaughn and others of your staff at the conclusion of the inspection. The inspection consisted of selected examination of procedures and representative records, interviews with personnel and observations by the inspector.

Within the scope of this inspection, three violations were identified. You are required to reply to these matters in accordance with the enclosed Appendix A. The response directed by this letter and the accompanying Notice is not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

An additional apparent violation, concerning following all requirements specified in a Radiation Work Permit issued in the Building 18 high bay area, was also identified during this inspection. This violation was reviewed and found to meet the mitigative tests described in 10 CFR 2, Appendix C; consequently, no Notice of Violation is being issued for this violation.

Another potential violation concerning the labeling and marking of internally contaminated shipping containers was identified upon receipt of a shipment from your Hematite, Missouri facility. This violation has been referred to our Region III office for appropriate disposition.

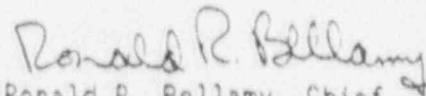
In addition, a detailed review of the Windsor site fire protection program was also conducted during this inspection by an NRC headquarters-based fire protection engineer. It is requested that you review the recommendations made by this individual and discussed in Section 8 of this report and inform this office by letter within sixty days of your actions planned to address these recommendations.

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JUL 20 1990

Your cooperation with us is appreciated.

Sincerely,



Ronald R. Bellamy, Chief
Facilities Radiological Safety
and Safeguards Branch
Division of Radiation Safety
and Safeguards

Enclosures:

1. Appendix A, Notice of Violation
2. NRC Region I Inspection Report No. 70-1100/90-05

cc w/encls:

A. E. Scherer, Vice President, Quality Systems
C. B. Brinkman, Manager, Washington Nuclear Operations
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
State of Connecticut

bcc w/encl:

Region I Docket Room (with concurrences)
Management Assistant, DRMA (w/o encl)
J. Roth, DRSS
G. Bidinger, NMSS
A. Datta, NMSS

APPENDIX A
NOTICE OF VIOLATION

Combustion Engineering, Inc.
Windsor, Connecticut

Docket No. 70-1100
License No. SNM-1067

During an inspection conducted on June 4-8, 1990, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (Enforcement Policy, 1988), the violations are set forth below.

- A. Section 4.1.5, "Internal Review Requirements," of Part 1, Criteria, of the NRC-approved license application for License No. SNM-1067 states, in part, that all process/equipment/facility changes which affect nuclear criticality safety shall be reviewed and approved in writing.

Contrary to the above, between April 6 and June 7, 1990, a process/equipment/facility change, which involved the addition of foam rubber and wooden blocks to the fluoroscope unit rack to support uranium containing fuel rods, was made and was not reviewed and approved in writing. This change could affect the nuclear criticality safety of the fluoroscope unit.

This is a Severity Level IV Violation (Supplement VI D)

- B. Section 2.8, "Investigations and Reporting," of Part 1, Criteria, of the NRC-approved licensee application for Licensee No. SNM-1067 states, in part, that abnormal occurrences are investigated in accordance with written procedures and reported to the Plant Manager. The written procedure written pursuant to the above is AP-1, Revision 0, "Abnormal Event Occurrence Reporting Procedure."

Contrary to the above, on April 6, 1990, the placement and use of foam rubber and wood blocks on the fluoroscope unit was reported as an abnormal occurrence and was not investigated and reported to the Plant Manager in accordance with written Procedure AP-1, Revision 0.

This is a Severity Level IV Violation (Supplement VI D).

- C. Section 3.2.3, "Ventilation Requirements," of Part 1, Criteria, of the NRC-approved license application for Licensee No. SNM-1067 states, in part, that when the face velocity at a ventilated hood drops below 100 fpm (feet per minute), the hood filters or ventilation system filter will be changed, brushed, or knocked down to increase the air flow to 100 fpm minimum or the hood shall not be used to handle radioactive material.

Contrary to the above, on June 7 and 8, 1990, the face velocities of the two hoods located in the Building 5 Ceramics Laboratory were below 100

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feet per minute (5. to 80), the hood or ventilation system filter(s) were not changed, brushed or knocked down and the hoods continued to be used to handle radioactive material.

This is a Severity Level IV Violation (Supplement VI D)

Pursuant to the provisions of 10 CFR 2.201, Combustion Engineering, is hereby required to submit to this office, within thirty days of the date of the letter which transmitted this Notice, a written statement or explanation in reply, including: (1) the corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved. Where good cause is shown, consideration will be given to extending this response time.

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 70-1100/90-05

Docket No. 70-1100

License No. SNM-1067 Priority 1 Category ULFF

Licensee: Combustion Engineering, Inc.
1000 Prospect Hill Road
Windsor, Connecticut 06095-0500

Facility Name: Nuclear Fuel Manufacturing and Nuclear Laboratories

Inspection At: Windsor, Connecticut

Inspection Conducted: June 4-8, 1990

Inspectors: *W. H. Austin, Jr.* 7/19/90
J. Roth, Project Engineer, Effluents Radiation
Protection Section, Facilities Radiation
Safety and Safeguards Branch (FRSSB), Division
of Radiation Safety and Safeguards (DRSS) date

A. Datta
Fire Protection Engineer, Fuel Cycle Safety
Branch, Division of Industrial and Medical
Nuclear Safety, Nuclear Material Safety and
Safeguards (NMSS)

Approved by: *R. Borge* 7/19/90
R. Borge, Chief, Effluents Radiation
Protection Section, FRSSB, DRSS date

Inspection Summary: Inspection on June 4-8, 1990 (Inspection Report
No. 70-1100/90-05)

Areas Inspected: Routine, unannounced inspection by a region-based inspector and a headquarters-based fire protection engineer of the licensed program including management controls, operations, transportation, emergency planning, fire protection and licensee actions on previously identified enforcement/open items.

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Results: Five apparent violations were identified. Violations: failure to maintain the Ceramics Laboratory hood air flow at 100 linear feet per minute (Paragraph 3.4); failure to evaluate the addition of foam rubber to the fluoroscope rack prior to use (Paragraph 7.0); failure to follow procedures which required the Abnormal Event Occurrence Committee to investigate the use of foam rubber on the fluoroscope rack (Paragraph 7.0). Non-Cited Violation: failure to follow the requirements of a Radiation Work Permit in the Building 18 high bay area (Paragraph 3.5). In addition, an apparent transportation violation for failure to properly mark empty contaminated containers was identified upon receipt of a shipment from the Combustion Engineering Hematite, Missouri facility. This violation was transmitted to NRC's Region III office for disposition (Paragraph 6.2).

DETAILS

1. Individuals Contacted

- *B. Ayres, Windsor Site Fire Marshal
- *J. C. Ballard, Operations Consultant
- *R. Bennett, Training Manager
- *J. F. Conant, Nuclear Material Licensing Manager
- *M. M. Glotzer, Quality Assurance Manager
- *K. R. Hayes, Industrial Safety Specialist
- *K. Keating, Windsor Site Security Manager
- S. Kucavich, Lead Radiation Protection Technician
- J. Limbert, Radiation Safety Officer
- J. Molton, Woods Project Manager
- *D. L. Parks, Nuclear Materials Manager
- *P. R. Rosenthal, Radiological and Industrial Safety Program Manager
- *R. Sheeran, Accountability and Security Manager
- *R. E. Vaughan, Plant Manager
- J. Vollaro, Radiological and Industrial Safety Supervisor

*Denotes those present at the exit interview. The inspector also interviewed other licensee personnel during the inspection.

2. Licensee Action on Previously Identified Enforcement/Open Items

(Closed) Inspector Follow-up Item (1100/86-04-01): Evaluate the impact of a fire involving uranium dioxide. The licensee evaluated the consequences of a fire involving uranium dioxide located inside and outside the facility. The evaluation indicated that the maximum airborne concentration at the nearest residence to the Windsor site would be insignificant (about 0.014% of the 10 CFR 20, Appendix B maximum permissible concentration for unrestricted areas).

(Closed) Inspector Followup Item (1100/86-04-02): Evaluation of a failure of the anhydrous ammonia tanks. The licensee evaluated the consequences of a failure of the anhydrous ammonia tanks to the nearest resident and to onsite personnel. There were no indicated consequences to offsite residents and onsite consequences could be minimized by restricting entry into the affected areas should an incident occur. Requirements to restrict access to affected areas were incorporated into the facility emergency procedures.

(Closed) Inspector Followup Item (1100/86-04-03): Establish a program and implementing procedures for the control of flammable and combustible materials. The inspector verified that the licensee established an industrial safety program (PR-10, Section 6, dated November 2, 1989) and implementing procedures were issued during May 1990.

- (Closed) Inspector Followup Item (1100/86-04-04): Storage of zircalloy machining wastes. The inspector verified that the licensee reduced the total quantity of zircalloy machining wastes stored and provided a protected storage area inside sealers located in the north yard of Building 17.
- (Closed) Inspector Followup Item (1100/86-04-05): Protection for gas cylinders containing explosive gases. The inspector verified that the licensee installed covered cages on the north outside wall of Building 17 to hold these cylinders. These cages protect the cylinders from direct sunlight and the weather.
- (Closed) Inspector Followup Item (1100/86-04-06): Dispensing of flammable liquids. The inspector verified that all flammable liquids in the Building 17-21 Complex are currently dispensed from properly grounded drums into grounded receptacle containers and that these containers are of a National Fire Protection Association (NFPA) approved type.
- (Closed) Inspector Followup Item (1100/86-04-08): Venting and grounding of flammable liquid storage lockers. The inspector verified that the flammable liquid storage lockers were fire resistant, properly grounded and vented, and were strategically located throughout the Building 17 facility.
- (Closed) Inspector Followup Item (1100/86-04-09): Establish a fire protection program for Building 17. The inspector verified that the licensee established a fire protection program for Building 17. A review of this program was conducted by a fire protection engineer during this inspection. The results of this review are presented in Section 8 of this report.
- (Closed) Inspector Followup Item (1100/86-04-10): Installation of sprinkler heads in fixed systems in accordance with NFPA-13 standards. The inspector verified that sprinkler heads in the Pellet Shop which were previously installed in a manner which precluded full coverage had been moved to provide coverage in accordance with NFPA-13 standards.
- (Closed) Inspector Followup Item (1100/86-04-11): Placement of fire extinguishers in easily accessible and strategic locations. The licensee re-assessed fire extinguisher locations. As a result of this assessment, the fire extinguishers were relocated, where necessary, and all locations were marked to make them easily identifiable.
- (Closed) Inspector Followup Item (1100/86-04-12): Installation of additional ionization or photoelectric smoke detectors. The licensee reevaluated the placement of smoke detectors in the Building 17-21 Complex. As a result of that evaluation, additional rate-of-rise heat detectors were installed in strategic locations throughout the Complex.

(Closed) Inspector Followup Item (1100/86-04-13): Assure daily collection and disposal of combustible trash, accumulated hydraulic fluids and cleanup of spills. The inspector verified that housekeeping had been improved throughout the Building 17 facilities, that accumulated hydraulic fluids had been minimized and that two spill response carts had been installed in appropriate areas.

(Closed) Inspector Followup Item (1100/86-04-15): Establish an industrial safety program. The inspector verified that the licensee established an industrial safety program which was described in Program Document PR-10, dated November 2, 1989.

(Closed) Inspector Followup Item (1100/86-04-17): Evaluate high ambient temperature in the Pellet Shop and its effect on worker safety. The licensee inspected the Pellet Shop ventilation system. As a result of this inspection, several discrepancies were identified and corrected which resulted in a decrease in the ambient temperature in the Pellet Shop.

(Closed) Inspector Followup Item (1100/86-04-19): Establish a program and implementing procedures to assure adequate housekeeping in Building 17. The inspector verified that the facility housekeeping program is as described in Program Document PR-10. Implementing procedures have been incorporated in Radiation Protection Instruction RPI-224.

(Closed) Inspector Followup Items (1100/86-04-20 & 21): Establish a program to assure that reviews and audits are conducted of NRC-license requirements associated with the Health Physics, Industrial Safety and Emergency Preparedness programs. The inspector verified that the licensee established a comprehensive internal review and audit program as described in two documents, Administrative Procedure AP-7 and Program Document PR-22.

(Closed) Inspector Followup Items (1100/86-04-23 & 24): Establish a preventive maintenance/inspection/test program for the anhydrous ammonia storage tanks and equipment, the ammonia disassociators and equipment, the fire sprinkler systems and other process equipment. The inspector verified that the licensee established and implemented a preventive maintenance/inspection/test program which was designed to assure proper continuous operation of all identified and other installed process equipment.

(Closed) Inspector followup Item (1100/86-04-25): Provide the anhydrous ammonia tanks with electrical grounding protection. The inspector verified that the licensee installed electrical grounding protection on each of the anhydrous ammonia storage tanks.

(Closed) Inspector Followup item (1100/86-04-26): Establish a fire fighting training program for fuel manufacturing facility personnel. The licensee has arranged with local fire department personnel to provide fire fighting training to all facility hourly operators, radiological

protection technicians and the manufacturing supervisor on an annual cycle. A series of classes in the use of fire extinguishers was provided, starting on June 11, 1990.

(Closed) Inspector Followup Item (1100/86-04-27): Instruct fuel manufacturing operators on the contents of Operations Sheets (procedures) and their location. The inspector verified that the facility general employee training (GET) modules and on-the-job-training information included instructions to workers concerning the contents and locations of Operations Sheets.

(Closed) Inspector Followup Items (1100/86-04-28 & 29): Evaluate the Windsor site emergency control center to determine if it is properly sized and provide an alternate emergency control center. The licensee conducted an evaluation of the emergency control center in use at the time of the inspection. On the basis of that evaluation, the emergency control center was moved from Building 6 to the Building 8/8A Complex (site east guardhouse). In addition, the licensee provided for an alternative emergency control center in Building 4 which would be used if the Building 8/8A Complex became uninhabitable.

(Closed) Inspector Followup Item (1100/86-04-48): Re-examine the technique used for the storage of out-of-use uranium oxide powder blending hoppers. The licensee examined the technique used to provide positive assurance that out-of-use powder hoppers were locked out-of-service to prevent inadvertent use. As a result of this examination the licensee modified the technique from wrapping a chain around each hopper to running a chain through an eyelet welded to each hopper and locking the chain in place.

(Closed) Inspector Followup Items (110/86-04-49 & 50): Assure that nuclear criticality safety analyses are documented in sufficient detail to permit an independent review and that the independent reviewer documents the basis for concurrence. The inspector verified that the licensee issued a series of instructions which provided analysts and reviewers with the guidance necessary to ensure appropriate documentation of each analysis and review. The inspector examined several analyses to assure that the instructions were being followed. No inadequacies were identified.

(Closed) Violation (1100/86-04-51): Failure to check operation of the fire door on the virgin powder storage area quarterly under power failure conditions. The inspector verified that the licensee instituted a procedure to assure that the fire door on the virgin powder storage area was checked quarterly to assure that the door closed whenever the fire sprinkler system was activated and under power failure conditions.

(Closed) Violation (1100/86-04-52): Failure to evaluate the storage of natural uranium rods on top of a safe slab in the Building 2 vault. Upon notification of this violation, the licensee immediately removed the natural uranium rods from the top of the safe slab. In lieu of conducting an evaluation, the licensee established administrative controls and procedures to assure that this type of storage would not take place. The inspector verified periodically between October 1985 and May 1990 that the licensee properly adhered to these administrative controls.

(Closed) Violation (1100/87-01-04): Failure to post areas of the facility with Caution-Radioactive Materials signs. The inspector verified that the licensee posted the primary access points and appropriate areas of the Pellet Shop as required.

(Closed) Violation (1100/87-01-05): Failure to label containers with Caution-Radioactive Materials signs. The inspector verified that the licensee labeled all containers as appropriate. In addition, the licensee requested a license amendment which would allow posting of signs at all entrances to the facility which would read "Every container or vessel in this area, unless otherwise identified, may contain radioactive material", in lieu of labelling all containers. The amendment approving the use of these signs was issued on January 4, 1988.

(Closed) Violation (1100/87-01-06): Failure to properly calibrate radiation detection instrumentation. The inspector verified that the licensee discontinued use of an in-house instrument calibration facility and selected an appropriate vendor to calibrate radiation detection instrumentation. This vendor continues to calibrate this instrumentation for the licensee.

(Closed) Violation (1100/87-03-01): Failure to post four of five furnaces in the Pellet Shop with nuclear criticality limit signs. The inspector verified that each of the furnaces in the Pellet Shop was posted with nuclear criticality limit signs.

(Closed) Violation (1100/87-03-02): Failure to maintain a twenty-foot separation between two arrays of shipping containers. The inspector verified that the licensee painted a yellow line on the ground between the two arrays of shipping containers to provide positive assurance that the required twenty-foot spacing would not be violated.

(Closed) Violation (1100/87-03-03): Failure to comply with all nuclear safety controls specified by a nuclear safety evaluation at the fluoroscope work station. The inspector verified that the licensee installed a positive restraining device on the fluoroscope work station as required by the nuclear safety evaluation to assure that carts containing fuel could not come within twelve inches of the fuel storage rack at the work station.

(Closed) Violation (1100/88-03-03): Failure to maintain pellets within the required four-inch slab thickness on the fuel pellet storage shelves. The inspector verified that the licensee installed a positive restraining bar and reduced the total quantity of pellets in trays to assure that the trays of pellets could not exceed the required four-inch slab thickness.

(Closed) Inspector Followup Item (1100/88-03-07): Licensee to establish a system to assure that controls established on equipment have been installed as required by written safety evaluations. The licensee has written and implemented two criticality safety instructions which require a documented inspection of equipment prior to startup to assure that all required controls have been installed.

(Closed) Violation (1100/88-03-08): Failure to evaluate the effects of an accumulation of uranium oxide powder under the conveyor adjacent to the Batch Makeup Hood on nuclear criticality safety. The inspector verified that the licensee, in lieu of conducting this evaluation, modified the interface between the hood and the conveyor to preclude the buildup of uranium oxide powder under the conveyor.

(Closed) Violation (1100/88-03-09): Failure to control the addition of uranium oxide powder to the Hammermill Hood to assure that the posted mass limit was not exceeded. The inspector verified that the licensee established a working mass limit on this hood which was less than the authorized limit to preclude exceeding the authorized limit. In addition, the licensee instituted a requirement to have Pellet Shop supervisors check each mass logsheet entry for arithmetic mistakes prior to each transfer.

(Closed) Violation (1100/88-03-11): Failure to include the uranium-235 contained in sediment removed from liquid waste tanks and pipes in Building 6 on inventory. Licensee actions were taken to include this quantity of uranium-235 on the facility SNM inventory until shipment to an approved burial site occurred. This shipment occurred on or about May 1, 1988.

(Closed) Violation (1100/88-03-12): Failure to adequately assess by testing, the results of the nuclear criticality safety training program. The inspector verified that the licensee established general employee training and refresher training programs in accordance with Program Document PR-11, "NFM-Training". These programs require testing with a passing grade of 80 percent. Nuclear criticality safety training was included in the testing requirement.

(Closed) Violation (1100/88-05-01): Failure to follow a requirement of a Radiation Work Permit (RWP). The failure involved the handling of contaminated ventilation system components by contractor personnel without wearing gloves. The inspector verified that the contractor personnel involved were immediately removed from the area and reinstructed in the

need to follow instructions specified in RWPs. In addition, the facility Radiological Protection Technicians were also reinstructed to maintain surveillance of contractor personnel working under RWPs to ensure appropriate compliance with requirements.

(Closed) Violation (1100/88-05-02): Failure to post Building 5 as required by 10 CFR 19. The inspector verified that the licensee posted the documents and/or notices required by 10 CFR 19 at each entrance to the building.

(Closed) Violation (1100/88-05-03): Failure to properly label waste containers prior to shipment. The inspector verified that the licensee modified measurement procedures to assure that each package placed into a waste container met the 10 CFR 71 special nuclear material exemption criteria for shipment so that each waste container could be properly labeled.

(Closed) Violation (1100/88-05-06): Failure to properly assay special nuclear material (SNM) in filters. The inspector verified that the licensee modified assay procedures and trained measurement personnel to assure that the SNM content of each measured filter was bounded by measurement standards as required by the facility Fundamental Nuclear Material Control Plan.

(Closed) Violation (1100/88-06-03): Failure to provide indium foils to visitors as required by license conditions. The inspector verified that the licensee modified each visitor identification badge used at the facility to incorporate a piece of indium foil which would be used as an exposure monitor in case of a nuclear criticality excursion at the facility.

(Closed) Unresolved Item (1100/88-08-01): Failure to maintain a twenty-foot separation between an array of shipping containers located outside the facility and shipping containers containing special nuclear material inside the west wall of the Pellet Shop Annex. The inspector verified that the array of shipping containers located outside the west wall of the facility had been moved and all equipment located inside the west wall had been removed as a result of the redeployment of equipment to the CE Hematite, Missouri facility. As a result of these actions, the identified issue is no longer of concern.

3.0 Review of Operations

The inspector examined selected areas of the plant and the nuclear laboratories to observe operations and activities in progress, to inspect the nuclear safety aspects of the facilities and to examine the general state of cleanliness, housekeeping, adherence to fire protection rules, and the status of redeployment activities.

3.1 Redeployment Activities

During a tour of the Pellet Shop, the inspector observed that redeployment activities were continuing. The dewax and sintering furnaces and pellet grinders had been removed and sent to the new pellet manufacturing facility located in Hematite, Missouri. Other equipment such as glove boxes, hoods and blenders were removed, cleaned, cut up, packaged and sent to a contractor for decontamination/disposal. Disposal will be subsequently accomplished after decontamination such that the material can be released for unrestricted use or by burial at an approved burial site. Equipment which, in the opinion of licensee personnel, cannot be decontaminated, will be packaged and sent directly to an approved burial site. The inspector observed that the licensee removed all fuel powder handling equipment from the Pellet Shop and had initiated removal of the powder blending station mezzanine and associated hardware. Only five operating workstations remained in the facility at the time of this inspection. These included two general purpose hoods, the weighing station, the filter knockdown hood and a hood containing the large waste water centrifuge system.

The inspector observed an operator breaking welds on potentially contaminated rigid screening surrounding the former powder hopper elevator station. Although this individual was wearing a breathing zone sampler, it was noted that the head of the sampler was shielded in the overhead direction by the individual's coverall collar. Since the worker was working on areas above his head, this arrangement would tend to provide questionable information with regard to inhaled exposures. Licensee representatives immediately had the individual uncover the sampling head of the breathing zone sampler. Subsequent evaluation of available general area air samplers indicated that this individual should not have been exposed to significant airborne contamination during the period of time in question.

3.2 Posting of the Hydrogen Analyzer Room

During examination of the Hydrogen Analysis Laboratory located under the FA-3 Mezzanine, the inspector noted that the posted criticality safety control for the laboratory was a four-inch slab. However, the inspector noted that several trays of pellets located on tables adjacent to the hydrogen analyzers were marked to identify an eight-kilogram mass as the criticality safety limit for the trays. The inspector identified the existence of the two limits as an inconsistency. As such, one of the limits should be specifically identified and maintained. Licensee representatives indicated that the use of the two limits in this laboratory would be reevaluated.

3.3 Building 5 Ceramics Laboratory Hood Ventilation

During examination of the Building 5 Ceramics Laboratory, the inspector observed that air flow through the face of one hood located along the south wall was between 50 and 80 linear feet per minute on a velometer mounted in the opening. At the request of the inspector, a licensee representative conducted an air flow survey of this hood and an adjacent hood using another velometer. At the time, uncontained uranium oxide was present in one of the hoods and the hood was in use. This survey verified that the previously obtained air flow was present in both hoods. Failure to maintain airflow through the face of these hoods at a minimum of 100 linear feet per minute was identified as an apparent violation of Section 3.2.3 of the NRC-approved licensee application (1100/90-05-01).

3.4 Building 18 High Bay Area

While examining the Building 18 high bay area, the inspector observed several individuals handling a depleted uranium fuel rod bundle without cloth gloves. The use of the cloth gloves was required by Radiation Work Permit (RWP) No. 1-90-6, which was scheduled to expire on June 20, 1990. Upon identification of this discrepancy by the inspector, actions were taken by the appropriate individuals to locate and use the cloth gloves as required and the individuals were reinstructed in the need to follow all established requirements of RWPs. Since no radiological hazard appeared to be involved and actions were taken to immediately correct this inadequacy, this was identified as an apparent noncited violation (1100/90-05-02), in that the criteria specified in 10 CFR 2, Appendix C, Section V.A, were met. These criteria included; 1) corrective actions were immediately taken and completed by the licensee, 2) this was a Severity Level V violation, and 3) this violation was not willful. Adequate corrective actions were completed by the licensee prior to the end of this inspection. In accordance with the criteria of 10 CFR 2, Appendix C, Section V.A, no Notice of Violation will be issued for this apparent violation.

4.0 Contaminated Wooded Area

Through discussions with licensee representatives the inspector determined that the licensee has assigned a project manager the task of assuring that the wooded area adjacent to and surrounding the former waste storage pad has been cleaned up. At the exit meeting the inspector once again requested the licensee to provide the NRC with a status report which described the status of the characterization study. This request was previously made during inspections 70-1100/89-07 and 70-1100/90-02. The status report was expected to contain information on the results of the

characterization study, decontamination plans and procedures, and a projected completion date. Subsequent to this inspection, the licensee provided NRC with a letter report, dated June 25, 1990, which included a project summary and an overall status to date. A copy of this report is attached (Attachment No. 1).

5.0 Emergency Preparedness

During the course of this inspection, the inspector observed actions taken by the licensee to respond to emergency drills conducted during the day shift at the Building 17 Nuclear Fuel Manufacturing facility and at the Building 5 Nuclear Laboratories. The former drill was held on June 4, 1990 and the latter drill was held on June 5, 1990.

Subsequent to the drills, the inspector provided the following comments to licensee representatives for their consideration.

- 5.1 It was noted by the inspector that the Building 8 emergency equipment storage area was being used as the emergency control center by assigned emergency directors, but was not equipped with a telephone. As a result, there was no immediate capability available for the emergency director to respond to media or outside agency questions in a timely manner. Licensee representatives stated that these individuals were located within 30 feet of a telephone and could leave the control center if necessary. However, this comment would be reviewed and addressed.
- 5.2 During one of the drills the inspector observed a guard in the Building 8A East Guard Shack making telephonic notifications to outside agencies and persons on the call-in list. However, this individual could not respond to requests for information, and the emergency director or other licensee management representative was not available to provide the requested information. These individuals were located in Building 8, which was immediately adjacent to the guard shack. This inadequacy was corrected by the licensee during the second observed drill by stationing a management representative, equipped with a hand-held radio, in the guard shack. This individual was assigned the task of responding to questions received by the guard.
- 5.3 The inspector questioned the technique of personnel accountability, since emergency response organization staff report directly to the emergency control center without first going through the personnel accountability checkout point located in Building 3. Licensee representatives stated that procedures will be established to assure that all personnel are accounted for during emergencies.

- 5.4 The new emergency control center was located to the south south east of Building 17 and it was noted that the prevailing wind direction was from the south. As a result, survey teams could have to traverse the road immediately adjacent to Building 17 in order to find the plume. Because of the resulting potential for unnecessary exposure of the survey team, the inspector suggested that maps of the site showing all available access roads be placed in the emergency control center. This information could be used by the survey teams to reduce radiation exposure to the team as they conduct onsite surveys. Licensee representatives stated that these maps would be made available at the emergency control center.

6.0 Shipping and Receiving

6.1 Receipt Surveys

The inspector observed as licensee personnel conducted radiation and contamination surveys of a transport vehicle and packages containing uranium oxide pellets upon arrival at the site from the Combustion Engineering Hematite, Missouri facility. No inadequacies were identified.

6.2 Receipt of Empty Boxes

The inspector observed as a transport vehicle (open flatbed trailer) entered the Windsor, Connecticut site carrying three large wooden boxes. None of the boxes were marked or labeled with official radioactive material signs or markings. However, one side of each box contained a piece of yellow tape marked, "Radioactive, Empty-UN2908." Upon examination of the shipment Bill of Lading, the inspector determined that the wood boxes were identified as being empty radioactive shipping containers which had contained radioactive materials. There was also a statement on the Bill of Lading which indicated that "the package(s) conforms to the conditions and limitations specified in 49 CFR 173.427 for excepted Radioactive Material - Empty Packages-UN2908". The inspector also determined through discussions with licensee representatives that these packages were previously used to transport contaminated equipment to the Combustion Engineering Inc. Hematite, Missouri facility from the Windsor, Connecticut site. Title 49 CFR 173.427, "Empty radioactive materials packaging", states that a packaging which previously contained radioactive materials and has been emptied of contents as far as practical, is excepted from the shipping paper and certification, marking and labeling requirements of this subchapter, and from requirements of this subpart, provided that: (a) It complies with the requirements of §173.421 (b), (c), and (e); (b) The packaging is in unimpaired condition and is securely closed so that there will be no leakage of radioactive material under conditions normally incident to transportation; (c) Internal contamination does not exceed 100 times the limits in §173.443; (d) Any labels

previously applied in conformance with Subpart E of Part 172 of this subchapter are removed, obliterated or covered and the "Empty" label prescribed in §172.450 is affixed to the packaging; and (e) The packaging is prepared for shipment as specified in §173.421-1.

Upon receipt at the Windsor site, the three packages were not marked with the appropriate "Empty" label prescribed in 49 CFR 172.450 as required by 49 CFR 173.427 (d). As a result, this was identified as an apparent violation of federal shipping regulations which would be cited against the shipper (the Combustion Engineering Hematite, Missouri facility). Since the Hematite, Missouri facility is located within the NRC Region III jurisdiction, the above information with regard to this apparent violation will be forwarded to that office for appropriate disposition.

7.0 Employee Allegation

During the course of this inspection, the inspector held discussions with a licensee employee who stated that the fluoroscope unit rack used to handle uranium-235 containing fuel rods had been modified by the addition of foam rubber or wooden blocks to support the rods, on or about April 6, 1990 and no criticality safety evaluation was conducted to show that this modification was safe. In addition, this incident was not investigated by the Facility Review Group or the Abnormal Event Occurrence Review Committee as required by licensee procedures, after being reported to management on or about April 6, 1990. Licensee representatives indicated that a criticality safety evaluation was not conducted because the wood blocks and foam rubber were removed immediately after being reported, and also stated that the event was not investigated to determine the root causes of the incident. Failure to evaluate the effect of the addition of the wood blocks and the foam rubber on the criticality safety of the fluoroscope work station was identified as an apparent violation (1100/90-05-03) of Section 4.1.5 of the NRC-approved license application. In addition, failure of the Abnormal Event Occurrence Review Committee to conduct an investigation of the root causes of this incident was also identified as an apparent violation of Administrative Procedure AP-1, "Abnormal Event Occurrence Reporting Procedure" (1100/90-05-04). Upon notification of these apparent violations to licensee management representatives by the inspector, actions were immediately taken by the licensee to initiate a nuclear criticality safety evaluation and an investigation of the root causes for this incident. These actions were not completed by the end of this inspection.

8.0 Fire Protection Program Review

During this inspection, the inspector was accompanied to the Windsor site by a fire protection engineer assigned to the NRC Office of Nuclear Material Safety and Safeguards (NMSS). The Windsor site fire protection program was measured against the requirements of the recently published

Branch Technical Position on fire protection, as well as prevalent industry standards, notably the National Fire Protection Association codes. In performing the assessment, the fire protection engineer examined all buildings and adjacent outdoor storage, materials handling, and equipment areas which house or support licensed activities. Documents were examined for the purpose of assessing the licensee's commitment to the fire protection program and performance of procedures. The assessment methods also included examination of randomly selected portable extinguishers, installed fire protection equipment, process equipment, and past inspection reports of American Nuclear Insurers (ANI). Several facility employees and offsite Fire Department personnel were also interviewed.

8.1 Building Fire Safety

The fuel manufacturing processes of the facility are located in Building 17. This is a high-bay structure of steel frame, concrete floor, a composite "transite" and fiberglass insulating board outer shell and a built-up roof on gypsum deck. The entire building, including the adjoining annex, is covered by fixed automatic sprinkler systems. This coverage was determined to be adequate and no deficiencies were identified.

In addition to the main fuel manufacturing building (Building 17), the fire safety engineer also toured the following other buildings, in which licensed activities were performed or because of their importance to the overall fire safety of the site:

1. Buildings 1 and 1A: Storage
2. Buildings 2 and 2A: Engineering Development & Services
3. Buildings 3 and 3A: Kreisinger Development Laboratory
4. Building 5: Engineering Development Laboratory
5. Building 6: Liquid Waste Retention Vault
6. Building 6A: Maintenance Shop
7. Building 8A: Site Security Building
8. Building 11: Fire Pump House
9. Building 16: Model Shop
10. Building 18: Engineering Development Laboratory (high-bay building, adjacent to Building 5)
11. Building 21: Nuclear Products Manufacturing Warehouse

Of these, buildings, fire protection of the Building 16, Model Shop, was determined to be inadequate. This building contained a moderate to heavy fire load, mainly consisting of ordinary combustibles, such as wood and plastic. Hot working with blow-torches was frequently performed in this building, as determined from actual observation and through interviews with employees. One employee was observed "taking the siren off" plastic shipping containers with a blow-torch for the purpose of stenciling, without benefit of a formal "hot working permit" or a fire watch. In addition, this building did not have an installed automatic fire suppression system.

Buildings 2 and 2A were partially covered by sprinklers and by a stand-pipe and hose system. However, the high-bay test facility portion of Building 2, used for storage of combustible packages, was not covered by an automatic suppression system. The fire load, combined with the potentially contaminated controlled zones, should necessitate the use of one or more automatic fire suppression systems in the area. The fire protection engineer also noted that a written evaluation of the area by American Nuclear Insurers also resulted in a similar recommendation. The fire protection engineer recommended that the licensee review and correct fire protection problems identified in Buildings 2 and 16 (1100/90-05-05).

The Building 21 Warehouse facility was fully covered by a sprinkler system, which was determined to provide adequate fire protection for the building. However, a yard storage and dispensing area for lubricants and other combustible liquids located within 15 feet to the south was determined to be a potential hazard to the building. This matter was discussed with the facility management. Facility management indicated that this yard storage would be eliminated in the near future. The fire protection engineer also noted another oil-dispensing area and storage of about six 55-gallon oil containing drums located in the southeast corner of the building. Facility management also committed to remove these so that no combustible liquid would be dispensed in or near the building. The fire protection engineer also examined a newly installed portable Factory Mutual-approved flammable liquids shed constructed for the purpose of storing these liquids. This shed was located in the Building 17 north yard at a sufficient distance away from the other buildings.

All other buildings examined were determined to have adequate fire protection equipment.

8.2 Process Fire Safety

The fire protection engineer examined the manufacturing process and related equipment for fire safety. Two outdoor anhydrous ammonia storage tanks and an ancillary equipment building for dissociation of the gas were located to the north of Building 17. One of the tanks, 6,000-gallon capacity, was found to be in use, and the other was empty and awaiting removal. The dissociated gas was piped into Building 17 for use in the pellet drying furnace. This furnace was not fitted with a flame supervision device for the natural gas flame used to burn off the hydrogen. These flame supervision devices are required by NFPA 86C, "Standard for Industrial Furnaces Using a Special Processing Atmosphere". The fire protection engineer recommended that the licensee install a supervision and alarm system on this furnace (1100/90-05-06).

The nitric acid pickling area in Building 17 and the basement were also inspected. No deficiencies were identified.

Zircalloy chips produced in the Building 17 machine shop were stored in marked containers under water until removed from the building. Sealed drums of zircalloy chips were then stored in seatainer shipping containers away from the buildings, until disposal. No deficiencies were identified.

The fire protection engineer observed a yard storage and dispensing area to the west of the Building 6A, Maintenance Shop. Eight dispensing 55-gallon drums of combustible liquids, including one containing trichloroethane, were stored on racks which were not electrically grounded. There was evidence of previous liquid spills which flowed to a "retention basin" nearby. This retention basin, which appeared to be an unlined hole in the ground, was a potential pollution source for a nearby pond and was also a fire hazard. Upon identification of this hazard to management personnel, removal of the drums was immediately initiated.

E.3 Fire Protection Equipment

The Windsor site is protected by fire water, supplied by the Metropolitan District Commission of Hartford, Connecticut, consisting of a total of 425,000 gallons stored in storage tanks. The remainder of the fire water delivery system consists of one diesel and one electric fire pump, a jockey pump, an 8" fire main, and an adequate number of fire hydrants to service the site buildings. The fire water and delivery systems were determined to be adequate.

In addition to the fixed fire suppression equipment (sprinklers, stand-pipes and hose systems) mentioned above, portable fire extinguishers were deployed throughout the site. The fire protection engineer selected at random and inspected several fire extinguishers. The type and capacity of the extinguishers were appropriate and the monthly inspection tags, for the most part, were up-to-date. However, exceptions were found in that a few extinguishers located in Building 5, had not been inspected during the month of May 1990.

Rate-of-temperature-rise type fire detectors were located in the fuel manufacturing areas of Building 17. These were connected to an annunciator panel in the guard house located at the entrance to the building. The fire protection engineer requested the licensee to conduct a test of the alarm system. No deficiencies were noted.

Pull-boxes were installed at several locations throughout Building 17. However, the fire protection engineer recommended that the licensee install additional pull-boxes at two additional strategic

locations near exit doors in the Cold Shop (south side) and the Pellet Shop Annex on the north side of the building. The pull-boxes, fire detectors, and sprinkler flow sensors were connected to a central annunciator panel at the Site Security Building, Building 8A. No deficiencies were found in the alarm system.

Fire protection equipment maintenance records were examined for timely inspection and maintenance of the equipment. Maintenance records of portable extinguishers and the fire pumps were examined. The records indicated that the fire pumps were tested annually. However, there were no records available to confirm that weekly run tests of the pumps and the diesel engine were conducted. Thus the licensee could not demonstrate that these tests were conducted. NFPA 20, Centrifugal Fire Pumps, requires that "engines shall be started no less than once a week and run for no less than 30 minutes to attain normal temperature." Also, the automatic operation of the pumps should be tested weekly, and "at least one start shall be accomplished by reducing the water pressure". Records of maintenance of the diesel engine and the batteries were also unavailable at the time of this review. In addition, there was no evidence that the fire hoses (located in Building 2) had ever been tested. NFPA 1962, "Standard for the Care, Use, and Maintenance of Fire Hose Including Connections and Nozzles," requires annual testing and inspections. The licensee was not able to demonstrate that these tests and inspections had been conducted. As a result, the fire protection engineer recommended that the licensee initiate weekly fire pump and diesel starts and annual fire hose and fitting inspections and tests if they are not currently being performed and that appropriate records be maintained of these tests and inspections (1100/90-05-07).

The fire protection engineer also determined that fire protection equipment maintenance and record keeping needed to be improved in that equipment maintenance records should be in one place and under the control of one office, so that appropriate maintenance could be tracked. The fire protection engineer recommended that a comprehensive fire protection equipment maintenance program be initiated with an improved record keeping and maintenance tracking system (1100/90-05-08).

8.4 Pre-Fire Planning

The fire protection engineer examined the Radiological Contingency Plan for the facility and the Emergency Plan Implementing Procedures. Both contained planning information relating to emergency responses including fire emergencies. However, particular information that would be required by facility employees and offsite fire brigade personnel, e.g., a pre-fire plan, was unavailable. A pre-fire plan should provide information on the facility, such as

location, quantity, and nature of the combustibles in each area; restriction of fire fighting methods, such as use of fire hose streams; and location of the pumps, post indicator valves, hydrants, stand-pipes, sprinkler valves, fire department compatible couplings, etc., preferably with drawings and charts. The fire protection engineer recommended that the licensee establish a formal pre-fire plan which would complement the facility Radiological Contingency Plan (1100/90-05-09).

The fire protection engineer was subsequently informed by the licensee by letter dated June 18, 1990, that the Poquonock Fire Company has a drawing showing the location of the fire mains, hydrants, and post indicator valves for the entire site, and that additional drawings on critical systems for Building 17, are available at the Building B/8A emergency control center. The fire protection engineer recommended that Emergency Plan Implementing Procedure EPJP 3.01, "Fire/Explosion", be expanded to constitute the pre-fire plan which should include these drawings.

The licensee does not provide fire fighting training to any one group of employees, e.g. a fire brigade. However, there is a plan to provide fire extinguisher training to all employees. This training, which will not include the use of live fires, was initiated during the second week of June, 1990.

During this review the fire protection engineer interviewed the fire chief of the Poquonock, Connecticut, Volunteer Fire Department. This fire department is the first unit expected to come to the aid of the Windsor site in the event of fire or non-fire emergencies. However, the fire protection engineer determined from the fire chief that the licensee did not routinely have the crew of the fire department tour the facility once a year for the purpose of familiarizing themselves with particular onsite hazards and fire protection features. Since the facility lacks a trained fire brigade, the fire protection engineer considered it especially important for the fire department to be well acquainted with the facility. Therefore, the fire protection engineer recommended that all members of the local fire department be invited to visit the facility at least annually to familiarize themselves with the facility (1100/90-05-10).

The fire protection engineer determined that evacuation drills, including some with fire scenarios, were held once each six months at Building 17. However, no critiques of these drills were available for inspection and no drills have been performed in recent years with onsite participation of offsite fire departments and rescue organizations. The fire protection engineer recommended that the licensee include offsite fire department personnel in drills on a regular basis (1100/90-05-11).

8.5 Administrative Controls

The fire protection engineer examined the following documents in order to determine the extent of administrative controls exercised over facility modification/change procedures insofar as it affects fire safety, hazardous operations, such as welding and other hot working, housekeeping, and safety audits.

1. Change/Modification Request Procedure: Such requests are reviewed for fire safety by the Industrial Safety Specialist.
2. NFM Safety Committee minutes: Meetings of this committee have been held quarterly. Safety issues were discussed and corrective steps were reviewed.
3. Industrial Safety Instructions (ISI): The following ISIs were reviewed.

ISI 104: Hazard Communications

ISI 105: Nitric Acid Use in the Pickling Process

ISI 108: Hot Working Permit. This document detailed the procedure to be followed for the issuance of hot working (welding, torch-cutting, etc.) permits and the precautions to be taken, including posting of the fire watch and providing fire extinguishers. However, this ISI has not been implemented since employees had not been trained in fire extinguisher use. This training was scheduled for the second week of June 1990.

ISI 109: Portable Fire Extinguishers. Locations of portable fire extinguishers and the procedure and forms for recording of test performance of the extinguishers were provided in the ISI.

No inadequacies were found in the documentation reviewed. However, the fire protection engineer was concerned about the effectiveness of the administrative controls in the area of housekeeping in that several rooms in Building 5 were cluttered with sundry objects, such as empty cardboard boxes, that should have been removed; several eye-wash stations were obstructed by debris, including a jar of corrosive liquid found in the Environmental Laboratory; the Building 21, Warehouse, had several of its aisles obstructed with wooden pallets, hand carts, cardboard boxes, and shipping containers. In-aisle storage reduces the effective width of the aisle and invalidates sprinkler calculations. As a result of these observations, the fire protection engineer recommended that the licensee institute more restrictive housekeeping measures (1100/90-05-12).

9.0 Exit Interview

The inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on June 8, 1990. The inspector summarized the scope and findings of the inspection. The fire protection engineer also provided the licensee with the recommendations for fire protection program improvements made during the course of this onsite review. The licensee indicated that these recommendations would be reviewed and appropriate actions would be taken.