U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 70-1100/89-03

Docket No. 70-1100

License No. SNM-1067 Priority 1 Category ULFF

Licensee: Combustion Engineering, Incorporated
1000 Prospect Hill Road
Windsor, Connecticut 06095

Facility Name: Nuclear Fuel Manufacturing and Nuclear Laboratories

Inspection At: Windsor, Connecticut

Inspection Conducted: May 22-26, 1989

Inspectors: J. Roth
J. Roth, Project Engineer, Effluents Radiation Protection Section, FRS&SB, DRSS — 6/28/89 date

Approved by: R. J. Bores
R. J. Bores, Chief, Effluents Radiation Protection Section, FRS&SB, DRSS — 6/28/89 date

Inspection Summary: Inspection on May 22-26, 1989 (Report No. 70-1100/89-03)

Areas Inspected: Routine, unannounced inspection by one region-based inspector of the licensed program including reviews of operations, organization, training programs, emergency planning program, completed elements of the integrated improvement plan and licensee actions on previously identified enforcement items.

Results: One Severity Level IV violation was observed, failure to adequately evaluate bioassay results (paragraph 7.b(2)). A confirmatory survey of the formerly contaminated wooded area by an NRC contractor, Oak Ridge Associated Universities, confirmed that this area met the guidance values of 30 picocuries total uranium and 10 picocuries total thorium per gram of soil and can be released for unrestricted use (paragraph 6.a).

DETAILS

1. Individuals Contacted

- S. T. Brewer, President, Nuclear Power Business Division
- P. L. McGill, Vice President, Nuclear Fuel
- P. R. Rosenthal, Program Manager, Radiological and Industrial Safety
- R. N. Duncan, Director, Product Development
- C. R. Waterman, Vice President and General Manager, Nuclear Fuel Manufacturing
- L. V. Corsetti, Manager, Core Materials
- D. G. Stump, Manager, Radiological and Industrial Safety
  J. Vollaro, Health Physics and Safety Supervisor
- R. E. Vaughan, Manager, Operations
- A. E. Scherer, Director, Nuclear Licensing
- J. Ballard, Operations Consultant
- J. F Conant, Manager, Nuclear Material Licensing
  R. Bennett, Consulting Engineer

• denotes those present at the exit interview. The inspector also interviewed other licensee employees during the inspection.

2. Licensee Actions on Previously Identified Enforcement Items

(Closed) Inspector Follow-up Items (70-1100/86-04-08, 10-13, 19-20, 23-25, 27, and 45). During this inspection the inspector examined licensee actions to correct observations and recommendations made during an operational safety assessment conducted at the facility during the week of August 18-22, 1986. Those actions which would impact on the licensee's completion of program upgrades with regard to industrial safety and emergency planning were not reviewed during this inspection.

The inspector determined through a review of licensee records and discussions with licensee representatives that the licensee completed evaluations of the impact of fires involving uranium oxide, failure of the anhydrous ammonia tanks, storage of zircalloy machining wastes, and the protection of cylinders containing explosive gases. In addition, the licensee has vented and grounded flammable liquid storage lockers and assured that the sprinkler heads were installed in accordance with NFPA-13 standards. Fire extinguishers and smoke detectors were moved to appropriate locations and combustible trash is disposed of daily in accordance with an established housekeeping program. The inspector also determined that the licensee established equipment inspection/testing programs and a preventive maintenance program for the anhydrous ammonia storage tanks and equipment, the ammonia disassociators, the fire sprinkler systems and the process equipment located in and around the fuel manufacturing facility.

3. 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, and adherence to fire protection rules.

a. Postings

During examination of Building 17 fuel manufacturing facilities, the inspector noted that the licensee installed two "seatainers" in the yard adjacent to the fence in the northwest corner. Neither "seatainer" was posted with Caution - Radioactive Material signs nor labeled with the contents. At the request of the inspector, each container was opened for examination. The container closest to the north fence contained seven large boxes labeled with signs indicating the contents. Those boxes contained equipment which had previously been used in a natural uranium processing facility located in Canada. The "seatainer" was marked with a yellow and magenta sign containing a trifoil and the words, "HP clearance required for entry". The licensee had no records available that could provide information on the quantity of radioactive material present, and thus, could not show that the boxes contained less than 10 millicuries of natural uranium (100 times the 10 CFR 20 Appendix C limit) in accordance with the posting requirements of 10 CFR 20.203(e)(2). The licensee immediately posted the "seatainer" with Caution - Radioactive Material signs in accordance with 10 CFR 2.203(e)(2) until records of the actual uranium contents of the boxes could be located. The licensee committed to retrieve and maintain information on the actual contents of these boxes. This information will be examined during a subsequent inspection.

b. Warehouse Storage

The inspector noted that the licensee had improved the storage of materials in the Building 21 warehouse. Each of the aisles within the warehouse had been cleared to facilitate egress from any area of the building in case of emergency.

c. Nuclear Safety Log Sheets

The inspector examined the nuclear safety log sheets available in the Pellet Shop at the hammermill, the screening hood, the micronizer, and the blended powder drier belt to assure that mass limits or slab depths were not exceeded. The time period examined was from May 22-24, 1989. No inadequacies were identified.

4. Program Plan Reviews

During the course of this inspection the inspector examined draft copies of the Fuel Manufacturing Facility Emergency Plan and implementing procedures and reviewed completed and issued Administrative Guidelines, Administrative Procedures and Nuclear Fuel Manufacturing Programs. The Guidelines, Procedures and Programs reviewed included:

AP-1 "Abnormal Event Occurrence Policy"
AG-1 "Organization and Responsibilities"
AG-2 "Document Hierarchy"
PR-20 "Administrative Controls"
PR-21 "Commitment Tracking"

A draft copy of PR-3, "Criticality Safety", was also reviewed.

Comments generated during the reviews were provided to applicable licensee representatives.

With regard to the Emergency Plan and implementing procedures, the inspector noted that the designated emergency directors were in organizational positions which were not identified as safety-related in the current facility license or in organizational amendments submitted by the licensee to the NRC Office of Nuclear Material Safety and Safeguards (NRC-NMSS) for approval. As a result, neither the responsibilities nor the qualifications of these individuals were provided to the NRC for review. In addition, the inspector noted that there was no emergency procedure which detailed the training/qualification requirements for the emergency director, other emergency staff positions or re-entry team members. Information on this apparent organizational deficiency was provided to the NRC-NMSS Licensing Project Manager by the inspector and was also discussed at the exit interview. Licensee representatives stated that this apparent organizational deficiency would be resolved.

5. Training

The inspector examined licensee reviewed and approved copies of the following General Employee Training (GET) and retraining lesson plans.

Lesson Plan Title	Copy Dated
Organizat on and Administration	February 20, 1989
Facility Description	February 22, 1989
Quality Control	February 20, 1989
Security	February 21, 1989
Industrial Safety	February 21, 1989
Radiation Fundamentals	February 21, 1989

Criticality Safety	March 15, 1989
Emergency Preparedness	March 15, 1989
Radiation Worker Training (Radiological Safety)	March 15, 1989
Safety Retraining (Industrial/Criticality/Radiological/Emergency)	March 16, 1989

The inspector noted that most of the comments previously made during review of the draft documents had been incorporated into the lesson plans.

6. Residual High Enriched Uranium

a. Contaminated Wooded Area

On March 28, 1989, the NRC contractor, Oak Ridge Associated Universities, conducted a verification survey on the previously contaminated wooded area on the Windsor site. That survey was conducted in accordance with the "Proposed Survey Plan for Combustion Engineering, Inc." dated February 27, 1989 (Attachment No. 1), as modified.

The results of the survey are presented in Attachment No. 2. Identified contaminated areas were immediately remediated by the licensee and resurveyed by the NRC contractor. The surveyed area, with the exception of location 45N, 45E was found to be within the NRC guideline values of 30 picocuries total uranium per gram of soil and 10 picocuries total thorium per gram of soil. That one location was within the guideline value for total uranium but exceeded the guideline value for total thorium (14.6 picocuries total thorium per gram of soil). The 14.6 picocuries total thorium per gram of soil was reduced to 4.1 picocuries total thorium per gram of soil when averaged with adjacent areas. This averaging is authorized by NRC guidance contained in NUREG/CR-2082, "Monitoring for Compliance with Decommissioning Termination Survey Criteria". As a result of this survey, it was determined that the previously contaminated wooded area met the NRC recommended guideline values of less than 30 picocuries total uranium per gram of soil and 10 picocuries total thorium per gram of soil and can be released for unrestricted use.

b. Former Waste Pad

Through discussions with licensee representatives, the inspector determined that the licensee was preparing procedures and establishing processes for the cleanup of uranium contamination around the former waste pad. The licensee expected that this area will be cleaned up by about December 1, 1989.

7. Review of Allegations

During this inspection, the inspector examined licensee actions with regard to several allegations and concerns received by the NRC Regional Office.

a. Allegation File Number RI-89-A-0041

On April 14, 1989 a Nuclear Fuel Manufacturing facility worker called the NRC Region I office with the following concerns.

(1) Concern Number 1

There have been very noxious fumes in many places since Tuesday. Workers are getting nauseous, dizzy, suffering headaches and getting bloody noses.

This concern was referred to the Hartford, Connecticut, office of the Occupational Safety and Health Agency (OSHA) for resolution. That office contacted the licensee by letter dated April 18, 1989. The licensee responded to OSHA in a letter dated April 21, 1989 (Attachment No. 3). The licensee conducted an investigation and determined (1) that there had been one incident of nosebleed by an individual in the fuel bundle assembly room and one incident of a headache involving licensee personnel; (2) that these instances had not been previously reported to licensee management; and (3) that neither incident was related to the existence of noxious fumes anywhere in the facility during the time interval cited. No other incidents were identified during the licensee's investigation. During this inspection, the inspector attempted to contact the alleger to obtain additional information on this allegation. The attempts to contact the alleger were unsuccessful.

During this inspection, the inspector verified that violations of OSHA requirements identified during an OSHA inspection on November 16, 1987 to February 16, 1988 had been corrected. During the 1987-1988 inspection, the OSHA inspector noted that cleaning operations involving chlorinated hydrocarbons (perchloroethylene) were not located so that vapors from these operations would be prevented from being drawn into or reach the atmosphere surrounding any welding operation. Further, the OSHA inspector noted that individuals working on the Millicron machine, which uses a cutting oil (Powercut No. 360), were not protected from the cutting oil vapors, which cause headaches and bloody noses. During this inspection, the NRC inspector observed that the licensee had improved the ventilation systems associated with each of these operations, during 1988, to preclude the identified problems.

In conclusion, the inspector found no current basis for the alleger's concern relative to the noxious fumes.

(2) Concern Number 2

Several plant areas, including the bundle room, hot area ladies room, and several others were never posted for radiation/contamination control until the past couple weeks. Nothing has changed in these areas.

During this inspection the inspector observed several areas of the Fuel Manufacturing Facility which had been recently posted with Caution-Radioactive Materials signs in accordance with internally revised posting procedures. These areas included the door from the lunch room into the cold shop, and the outside entry walkway onto the driveway leading into the fenced in yard. The inspector suggested that the new internal posting requirements be reviewed to ensure that the approach is consistent with the intent of 10 CFR Part 20. The inspector also determined that the licensee had posted additional areas, but found no radiological condition changes warranting this action. The licensee will review this area.

(3) Concern Number 3

Bundles may not be getting surface contamination checks, as required before removal from the "hot" area.

The inspector verified through observation and review of procedures that the licensee wipe tested the surface of each completed fuel rod contained in the turret-rod carts prior to removal of the cart from the "hot" area. "Bundles" of fuel rods had never been sent into the "hot" area. The "hot" area was assumed by the inspector to be the pellet fabrication and rod loading area of the facility, the only possible source of surface contamination within the facility. The inspector found no evidence supporting the above concern.

(4) Concern Number 4

Janitors can't read the signs and routinely cross contaminated area/clean area lines during janitorial duties.

The inspector examined smear contamination survey results obtained from the clean side of various change lines throughout the facility. These included change lines in the men's change room, the women's change room and the double door between the pellet stacking area and the clean side of the facility. The survey results provided no evidence of any significant contamination on the clean side. The inspector found no evidence that the janitorial staff crossed change lines without changing shoes. During a subsequent inspection, the inspector will ascertain whether members of the facility janitorial staff understand the requirements of posted signs.

(5) Concern Number 5

NRC Form 3 may not be appropriately posted.

The inspector examined each entrance to facilities in which activities authorized under NRC License No. SNM-1067 were conducted and verified that the NRC Form 3 and other postings required by 10 CFR Parts 19, 20 and 21 were posted as required. No inadequacies were identified.

(6) Concern Number 6

Management has ignored complaints about the above items.

The inspector discussed each of the previous concerns with licensee management. Licensee management, including the shift supervisor and Mr. C. Waterman, Vice President and General Manager, Nuclear Fuel Manufacturing, denied being aware of any of the specific concerns, except for Concern Number 1, which was the subject of a telephonic request for information from the OSHA Hartford office, prior to this inspection. No evidence was obtained that indicated knowledge on the part of licensee management about the particulars of any of these concerns.

b. Allegation File Number RI-89-A-0035

On April 3, 1989 a Nuclear Fuel Manufacturing facility worker called the NRC Regional Office to report several concerns. These concerns included allegations that the licensee had not followed procedures and that the licensee did not do a proper evaluation of employee exposure following an incident. According to the alleger, while cleaning the FA-1 mezzanine on February 27, 1989 after a ventilation system filter change on February 25, 1989, two individuals received a burst of uranium oxide powder to their faces as they removed a plastic covering from the floor. The individuals noted that breathing zone air samplers they were wearing became dusty. They stopped the job and reported to the health physics office where they were found to be contaminated and were told to wash. An investigation was started by the licensee. During discussions with the NRC, the alleger indicated that he had been reprimanded and given two weeks off without pay for misuse of safety equipment. The alleger indicated that he had not misused safety equipment. The alleger was advised by the NRC to contact the U.S. Department of Labor to register a complaint. He was told that the NRC would conduct an investigation into the alleged unsafe practices on the part of the licensee. It was the inspector's understanding from discussions with licensee representatives that at the time of this inspection, the alleger's concerns were being reviewed under the grievance process between the worker's union and the company. Only the safety related allegations will be addressed in this report.

(1) General Allegations

By letter dated April 21, 1989 (Attachment No. 4), the NRC provided the licensee with a series of general allegations which were derived from discussions with the alleger regarding the maintenance of radiation controls at the Windsor site. These general allegations were adequately responded to by the licensee in a letter to the NRC dated May 19, 1989 (See Attachment No. 3). The inspector's review of these general allegations and the licensee's response to them indicated no basis for substantiating any of them.

(2) Specific Allegations

The following specific allegations were obtained from the initial NRC allegation report. These specific allegations were verified by the inspector through a review of licensee records. The results of this review by the inspector are provided below for each specific allegation.

- The company failed to follow procedures.

  According to the alleger's statement he was told to wash the contamination from his body prior to a survey by a health physics technician. This is alleged to be improper practice. During this inspection, the inspector was informed by the licensee representatives that the individuals involved in the alleged incident had returned their Breathing Zone Samplers (BZs) to the health physics office for analysis with the statement that "these may be hot." The individuals then proceeded into the men's change room to wash prior to evaluation of the BZ sampler filters. After evaluation of the BZs revealed the presence of uranium contamination, nasal smears were taken from each individual. The BZs indicated a maximum of 32 MPC-hours exposure to one individual and 60 MPC-hours to the second individual. Nasal smears indicated the presence of 15 dpm alpha per smear for the first individual and 10 dpm alpha per smear for the second individual. On the basis of these results, the individuals were restricted from the nuclear fuel handling area in accordance with procedures, and they were requested to provide urine and fecal samples for bioassay analyses. The alleged improper practice of failure to survey the individuals prior to washing following a suspected contamination on their persons is currently being litigated under the company-union grievance process, and will not be addressed here.

- Improper evaluation of the incident.

  The licensee conducted an investigation into this incident. Actions were taken by the licensee to determine surface contamination in the work areas, determine the results of the

breathing zone air samples, obtain nasal smears, obtain urine specimens and obtain fecal samples for analyses.

Licensee records indicated that actions were taken by the licensee to restrict the workers from further uranium uptake on the basis of the analyzed air sample data. However, further evaluation was not conducted on the basis of the additional bioassay data since the individual responsible for doing the analysis was not conversant with of the analytical techniques required. Failure to adequately evaluate the uptake of radioactive material on the basis of all available bioassay data was identified as an apparent violation of 10 CFR 20.201(b) which requires the licensee in part, to make or cause to be made such surveys as may be necessary for the licensee to comply with the regulations specified in 10 CFR 20.103 (70-1100/89-03-01).

An evaluation of the fecal sample results by NRC personnel making a number of assumptions with regard to the type of radioactive material and the excretion model indicated that one worker may have been exposed to 4 MPC-hrs exposure and the second worker to 2.4 MPC-hrs exposure. Based on the assumptions used, these levels are well below NRC limits.

The alleger's allegation with regard to improper evaluation of the incident was substantiated in that a complete evaluation of the exposure was not conducted by the licensee.

(3) Additional Information

During the investigation of these allegations, the inspector determined from licensee survey records that the maximum surface contamination in the area in which these workers received the airborne exposure was 20,000 dpm/100 cm^2. This level, according to the licensee's procedures, did not require the use of respiratory protection equipment during the cleanup operation.

Review of training records indicated that both individuals had received the required training in Radiation Safety prior to starting this work.

8. Exit Interview

The inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on May 26, 1989. The inspector summarized the scope and findings of the inspection.

Attachment No. 1

Oak Ridge
Associated Universities
Post Office Box 117
Oak Ridge, Tennessee 37831-0117

Manpower Education,
Research, and Training
Division

February 27, 1989

Mr. Jerry Roth
Region I
Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Subject: PROPOSED SURVEY PLAN FOR COMBUSTION ENGINEERING, INC., WINDSOR, CT

Dear Mr. Roth:

Enclosed for your comment is a copy of the proposed survey plan for the Combustion Engineering Site in Windsor, Connecticut.

If you have any questions concerning this plan, please contact me at FTS 626-2908.

Sincerely,

for

Michele R. Landis, Team Leader
Radiological Site Assessment Program

MRL:jws

Enclosure

cc: L. Rouse, NRC/6H3
D. Tiktinsky, NRC/6H3
G. LaRoche, NRC/6H3
E. Davis, NRC/6A4

PROPOSED SURVEY PLAN
FOR
COMBUSTION ENGINEERING, INC.
WINDSOR, CONNECTICUT

I. Introduction and Site Description

Combustion Engineering decontaminated and decommissioned a former high enriched uranium facility at their Windsor, Connecticut, site approximately 25 years ago. Some of the waste from decontamination operations was burned and the ash placed in drums for disposal; however, subsequent surveys identified some residual soil contamination over an area of about 0.5 ha (75 ft x 75 ft). Combustion Engineering performed cleanup of the property, packing and shipping residual ash to the Barnwell Radioactive Waste Disposal site. Soil samples collected after cleanup identified surface uranium contamination in some areas, still exceeding Nuclear Regulatory Commission (NRC) guidelines. An additional 5 to 7 cm of soil was removed from these areas. At the request of the Nuclear Regulatory Commission (NRC) the Radiological Site Assessment Program of Oak Ridge Associated Universities conducted a confirmatory survey of the site in October of 1984. The results of that survey indicated that several areas had residual enriched uranium and thorium surface soil contamination in excess of the guidelines established for unrestricted use.

In June of 1986 an additional 15-30 cm of soil was removed from the surface of this area by the licensee. ORAU at the request of NRC Region I will conduct a confirmatory survey to evaluate radiological conditions relative to the guidelines established for unrestricted release.

Prepared by the Radiological Site Assessment Program of Oak Ridge Associated Universities, Oak Ridge, TN, under interagency agreement NRC Fin. No. A-9076, between the U.S. Nuclear Regulatory Commission and the U. S. Department of Energy.

February 23, 1989

II. Purpose

The purpose of the ORAU survey is to determine the nature and extent of residual radioactive material present in the area.

III. Responsibility

Work described in this survey plan will be performed under the supervision of Mr. James D. Berger, Certified Health Physicist with the Radiological Site Assessment Program of the Manpower Education, Research, and Training Division of Oak Ridge Associated Universities.

IV. Procedures

1. The 30-foot (7.6 m) grid pattern, established as part of the licensee's cleanup and survey activities, will be used for ORAU survey reference.

2. A walkover surface scan of gridded areas will be performed, using gamma scintillation ratemeters, to identify locations of elevated radiation levels.

* 3. Radiation measurements at 1 meter will be taken at each grid intersection and at each identified location of elevated surface radiation

4/ 3. Surface (0-15 cm) soil samples, composite of soil taken from the center and at four points equidistant between the center and the grid block corners, will be collected from each block. Samples will also be taken from areas of elevated contact radiation, identified by the walkover scan.

V. Sample Analysis and Interpretation of Results

Samples and direct measurement data will be returned to the Oak Ridge, Tennessee, laboratory for analysis and interpretation. Soil will be analyzed by solid state gamma spectrometry. Radionuclides of concern are

* this procedural modification was accepted by and accomplished by the ORAU survey team

U-235 and U-238, and members of the natural thorium series; however, spectra will be reviewed for the presence of other identifiable radionuclides. Selected samples will be analyzed for isotopic uranium and thorium.

VI. Tentative Schedule

Site Survey	March 20-21, 1989
Complete Sample Analysis	May 1, 1989
Draft Report	June 1, 1989

Enclosure No. 2

Oak Ridge Associated Universities
Post Office Box 117
Oak Ridge, Tennessee 37831-0117

Manpower Education, Research, and Training Division

April 11, 1989

Mr. Jerry Roth
Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Dear Mr. Roth:

Enclosed are the preliminary results of ORAU's survey of the drum storage area on the Combustion Engineering property in Windsor, Connecticut. Surveys were performed on March 28, 1989 and consisted of surface scans, to identify any elevated areas, direct measurements, and collection of composite soil samples.

Surface scans identified four areas with elevated direct radiation levels which are shown on Figure 1. The results of the soil sample analysis for the composite soil samples, collected from each grid block, and for the samples from the areas identified by the surface scan are presented in Tables 1 and 2, respectively. Table 2 contains the results for samples collected prior to and subsequent to remediation.

Post-remediation concentrations of radionuclides in soil were: U-235, <0.2 to 0.8 pCi/g; U-238, <0.4 to 4.6 pCi/g; Th-232 <0.3 to 7.7 pCi/g; and Th-228, 0.6 to 6.9 pCi/g. With the exception of the sample from 45N, 45E, radionuclide concentrations are within guideline levels. The follow-up sample from 45N, 45E had a Th-232 and Th-228 concentration of 14.6 pCi/g which exceeds the 10 pCi/g guideline.

The area of contamination is small, less than 10 ft^2, and isolated. The average Th-232 and Th-228 concentration throughout the grid block, based on the concentration in the composite sample, is 1.8 pCi/g.

A final report will be completed and sent in May. Please call FTS 626-2908 if you have any questions or require any additional information.

Sincerely,

Michele R. Landis
Health Physics Team Leader
Radiological Site Assessment Program

MRL:jls

Enclosure

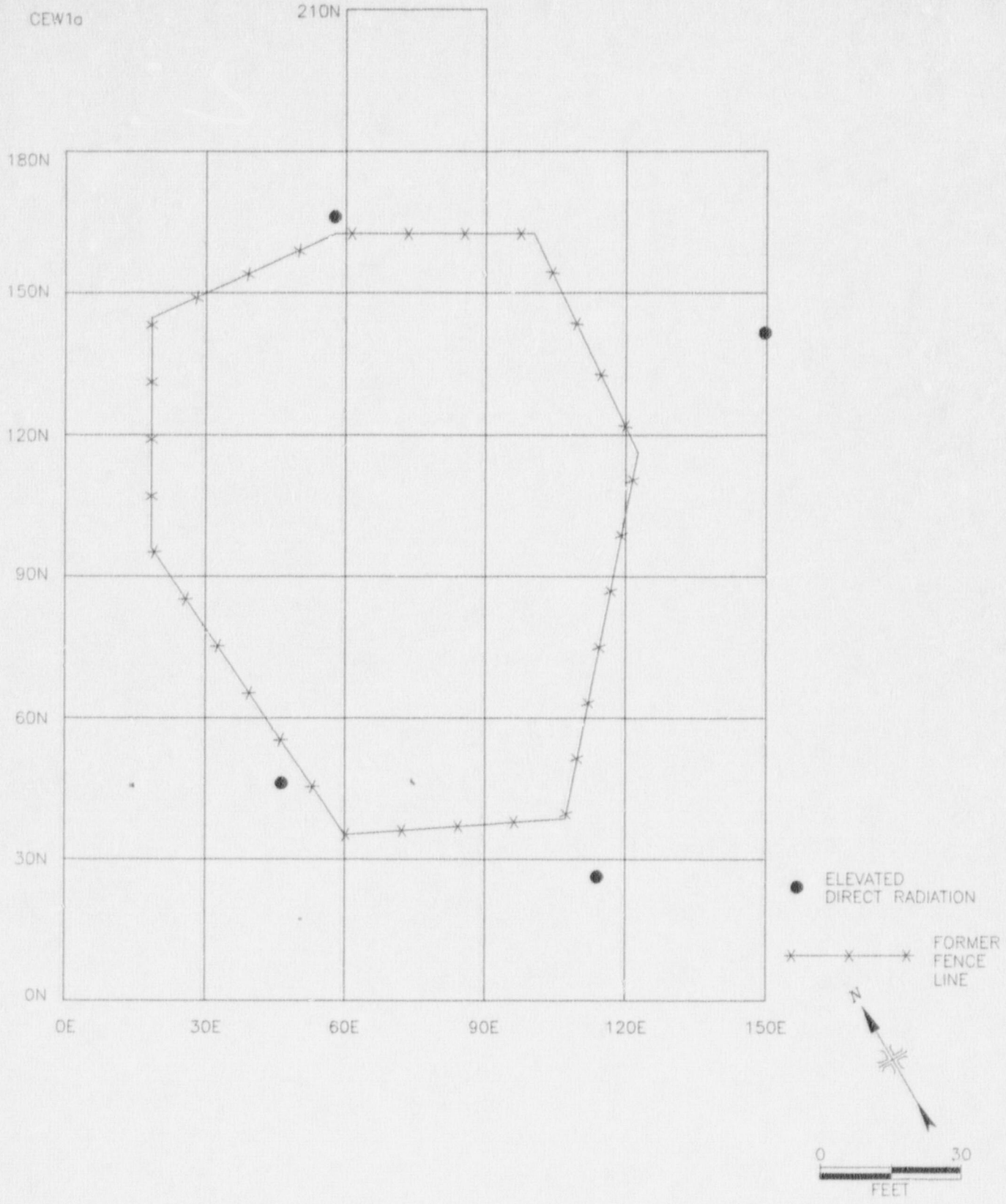

FIGURE 1: Locations of Elevated Direct Radiation Levels Identified by the Surface Scan

TABLE 1

RADIONUCLIDE CONCENTRATIONS IN COMPOSITE SURFACE SOIL SAMPLES
FROM GRID BLOCKS
COMBUSTION ENGINEERING PROPERTY
WINDSOR, CONNECTICUT

Grid Block Location[a]		Radionuclide Concentrations (pCi/g)			
		U-235	U-238	Th-232	Th-228
0N- 30N	-30E- 0E	0.2	0.8 ± 0.2[b]	0.5 ± 0.1	0.6 ± 0.3
	0E- 30E	<0.2	1.3 ± 0.2	0.6 ± 0.2	0.6 ± 0.3
	30E- 60E	<0.2	0.7 ± 0.3	0.6 ± 0.1	0.6 ± 0.3
	60E- 90E	<0.2	<0.4	0.8 ± 0.1	0.9 ± 0.3
	90E-120E	<0.2	1.6 ± 0.5	0.9 ± 0.2	0.9 ± 0.3
	120E-150E	0.7 ± 0.1	1.7 ± 0.3	1.1 ± 0.2	1.2 ± 0.3
30N- 60N	0E- 30E	<0.2	0.7 ± 0.6	<0.3	0.6 ± 0.3
	30E- 60E	<0.2	0.7 ± 0.2	0.9 ± 0.1	0.9 ± 0.3
	60E- 90E	<0.2	0.7 ± 0.3	0.9 ± 0.2	0.9 ± 0.3
	90E-120E	0.8 ± 0.2	0.7 ± 0.4	1.8 ± 0.3	1.5 ± 0.3
	120E-150E	<0.2	1.2 ± 0.3	0.9 ± 0.2	1.2 ± 0.3
60N- 90N	0E- 30E	<0.2	<0.4	1.0 ± 0.2	0.9 ± 0.3
	30E- 60E	<0.2	0.3 ± 0.4	0.9 ± 0.1	0.9 ± 0.3
	60E- 90E	0.2 ± 0.2	0.6 ± 0.2	1.5 ± 0.3	1.6 ± 0.3
	90E-120E	<0.2	0.3 ± 0.2	1.1 ± 0.1	0.9 ± 0.3
	120E-150E	<0.2	1.5 ± 0.3	0.8 ± 0.1	0.6 ± 0.3
90N-120N	0E- 30E	<0.2	0.7 ± 0.4	1.4 ± 0.2	1.8 ± 0.3
	30E- 60E	<0.2	0.4 ± 0.2	0.8 ± 0.2	0.9 ± 0.3
	60E- 90E	<0.2	0.5 ± 0.2	0.7 ± 0.2	0.6 ± 0.3
	90E-120E	<0.2	0.7 ± 0.4	0.8 ± 0.1	0.9 ± 0.3
	120E-150E	<0.2	1.5 ± 0.2	0.9 ± 0.2	0.9 ± 0.3
120N-150N	0E- 30E	0.5 ± 0.3	1.7 ± 0.6	3.7 ± 0.3	4.2 ± 0.3
	30E- 60E	<0.2	2.9 ± 0.3	2.6 ± 0.3	2.7 ± 0.3
	60E- 90E	<0.2	1.0 ± 0.2	1.1 ± 0.3	1.2 ± 0.3
	90E-120E	<0.2	1.3 ± 0.2	0.7 ± 0.2	0.6 ± 0.3
	120E-150E	<0.2	1.0 ± 0.3	<0.3	0.9 ± 0.3

TABLE 1 (Continued)

RADIONUCLIDE CONCENTRATIONS IN COMPOSITE SURFACE SOIL SAMPLES
FROM GRID BLOCKS
COMBUSTION ENGINEERING PROPERTY
WINDSOR, CONNECTICUT

Grid Block Location[a]		Radionuclide Concentrations (pCi/g)			
		U-235	U-238	Th-232	Th-228
150N-180N	0E- 30E	<0.2	<0.5	1.3 ± 0.2	1.5 ± 0.3
	30E- 60E	<0.2	0.9 ± 0.4	2.6 ± 0.2	2.1 ± 0.3
	60E- 90E	<0.3	2.2 ± 0.3	2.6 ± 0.2	2.7 ± 0.3
	90E-120E	<0.2	0.9 ± 0.4	1.7 ± 0.3	1.8 ± 0.3
	120E-150E	<0.3	1.9 ± 0.3	2.5 ± 0.2	2.4 ± 0.3
180N-210N	60E- 90E	<0.3	0.1 ± 0.3	1.5 ± 0.2	1.5 ± 0.3

[a]Refer to Figure 1.
[b]Uncertainties represent the 95% confidence levels, based only on counting statistics; additional laboratory uncertainties of ± 6 to 10% have not been propagated into these data.

TABLE 2

RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL SAMPLES
FROM LOCATIONS OF ELEVATED DIRECT RADIATION
C-MBUSTION ENGINEERING PROPERTY
WINDSOR, CONNECTICUT

Location[a]			Radionuclide Concentrations (pCi/g)			
			U-235	U-238	Th-232	Th-228
25N	115E	Prior to Remediation	<0.7	11.7 ± 1.4	27.7 ± 0.6	28.2 ± 0.6
		Post-Remediation	<0.2	1.2 ± 0.4	2.5 ± 0.2	2.1 ± 0.3
45N	45E	Prior to Remediation	0.7 ± 0.6	12.8 ± 0.8	18.4 ± 0.6	19.5 ± 0.6
		Post-Remediation	<0.3	<1.0	7.7 ± 0.4	6.9 ± 0.3
140N	150E	Prior to Remediation	<0.8	12.3 ± 1.3	27.9 ± 0.6	26.7 ± 0.6
		Post-Remediation	<0.2	1.3 ± 0.4	1.9 ± 0.2	2.4 ± 0.3
165N	57E	Prior to Remediation	<0.5	5.9 ± 1.0	14.1 ± 0.5	14.7 ± 0.3
		Post-Remediation	<0.3	4.6 ± 0.4	5.7 ± 0.3	4.8 ± 0.3

[a]Refer to Figure 1.

[b]Uncertainties represent the 95% confidence levels, based only on counting statistics; additional laboratory uncertainties of ± 6 to 10% have not been propagated into these data.

COMBUSTION ENGINEERING

May 19, 1989
LD-89-056

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

Dr. Malcolm R. Knapp, Director
Division of Radiation Safety and Safeguards
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, Pennsylvania 19406

Subject: Employee Allegations

Reference: Letter, M. R. Knapp (NRC) to P. L. McGill (C-E), dated April 21, 1989

Dear Dr. Knapp:

On April 17, 1989, Dr. W. Pasciak of your staff informed Combustion Engineering (C-E) of several employee allegations made directly to the Nuclear Regulatory Commission (NRC) regarding the adequacy of radiation protection controls at our Windsor Nuclear Fuel Manufacturing facility. Subsequently, these allegations were outlined in the Reference letter. We have completed our review of each allegation and the results are provided in the Enclosure.

While the Enclosure outlines the available information concerning each allegation, it is worthwhile to note that based on the information available to us, we have found each allegation to be without merit. As you know, Combustion Engineering is in the process of revitalizing our nuclear fuel manufacturing facilities as well as revising our staffing levels. Unfortunately, both of these activities will tend to lead to some staff dislocation as the manufacturing process is revised and as temporary staff is replaced by permanent staff. It has been our experience - as well as other industrial organizations - that employee dislocation tends to give rise to an increased level of allegations. This is not to say that Combustion Engineering in any way dismisses, or even diminishes, the importance it attaches to these allegations.

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Combustion Engineering takes -- and will continue to take -- all allegations of facility problems seriously and will investigate each to determine its veracity. Where an allegation proves to be credible, corrective actions will be taken immediately to alleviate any safety deficiency. A root cause investigation will also be conducted to determine if long term corrective actions are warranted to preclude recurrence of the problem.

While we understand and support the need for employees to be able to communicate directly with the Nuclear Regulatory Commission, we are understandably concerned when this route is taken before employees first try to handle concerns through available company channels. Combustion Engineering has and will continue to take steps to assure our employees that disclosure of facility problems to management will not result in any type of punitive action. Mechanisms are already in place for employees to report facility problems either formally (written reports), informally (verbally to their supervision or anyone in management), or anonymously if they so desire. Our Vice President and General Manager, has even posted his home phone number on the bulletin board so that employees can call him at any time. Please be assured that we will continue to take our responsibilities in this regard very seriously and will fully investigate every allegation no matter how it is received.

If you have any questions concerning the information provided herewith, please feel free to call me or Mr. J. F. Conant of my staff at (203) 285-5002.

Very truly yours,

COMBUSTION ENGINEERING, INC.

A. E. Scherer
Director
Nuclear Licensing

AES:jeb

Enclosure: As stated

cc: J. Joyner (NRC - Region I)
D. McCaughey (NRC)
W. Pasciak (NRC - Region I)
J. Roth (NRC - Region I)

Enclosure to
LD-89-056

WINDSOR NUCLEAR FUEL MANUFACTURING FACILITY
EMPLOYEE ALLEGATION REVIEW RESULTS

WINDSOR NUCLEAR FUEL MANUFACTURING FACILITY
EMPLOYEE ALLEGATION REVIEW RESULTS

GENERAL INFORMATION

When received from the Nuclear Regulatory Commission (NRC), the allegations did not contain specific information such as the nature of specific incidents(s) or date(s) of occurrence. We have, however, reviewed each of the generalized allegation statements and have provided a response to each which we believe to be representative of the conduct of operations at our Windsor Nuclear Fuel Manufacturing facility.

In general, we have found operations at the facility are executed in accordance with operating procedures, license conditions and regulatory requirements. In addition, we are providing the following supplemental material.

During and prior to the period that the subject allegations were reported to the NRC, a Management Inspection Program and an augmented Nuclear Quality Assurance Surveillance Program were in operation. These two programs were explained by the Vice President and General Manager, Nuclear Fuel Manufacturing during a recently completed Quality Awareness Experience training program. The programs were described as mechanisms to improve the communications between the various members of the organization. It was also stated that the management members and the members of our manufacturing quality assurance surveillance teams were in the shop to ascertain the level of compliance with existing procedures and instructions. Workers were encouraged to talk to these people both to get to know them and also to express any problems that they had with following procedures or recommendations they had for the way procedures should be revised.

The management inspections, which are still in place, cover all shifts. The management team is composed of the Vice President and General Manager, and managers reporting to him. Each member is assigned a specific area to inspect in the areas of industrial safety, radiation safety, criticality safety, accountability, procedures and license compliance, and employee attitude. In addition to satisfying the inspection function, additional management presence in the shop provides an enhanced opportunity for employees to discuss problems or recommendations for improvement with members of the management team.

The Nuclear Quality Assurance augmented Surveillance Program consisted of the assignment of an individual on each of the three shifts on an eight hour/shift basis. Workers were informed that, if they had difficulty in talking to their own management or supervision, they could talk to the surveillance inspectors who were not part of the Nuclear Fuel organization and, therefore, were independent of plant operations. Employees were free to discuss any subjects with these people in addition to quality related or procedures problems.

The Vice President and General Manager, in addition to being on the management inspection team, also makes frequent tours through the facility, on all shifts, and solicits comments from employees on any problems that they have encountered. His home phone number and pager number are also posted on all the bulletin boards in the manufacturing facility so that any employee who wishes to remain anonymous may call and express his or her concern at any time.

During the same week that these allegations were made, we understand that the NRC notified the Occupational Safety and Health Administration (OSHA) of a C-E employee's concern as to a potential health hazard existing in the fuel bundle assembly room. We were then contacted, in writing, by OSHA. Our investigation revealed an individual did, in fact, have a nosebleed and another had a headache. These individuals, however, did not feel the need to inform anyone within the company of their problems because they were aware of the cause and did not believe there was any facility related safety concern. A copy of the Combustion Engineering response to OSHA is attached for your information.

Allegation No. 1:

Workers are not being given proper instructions in appropriate radiation protection procedures to perform assigned tasks.

Response:

Pursuant to license requirements all employees of the fuel manufacturing facility receive formal classroom training prior to working in restricted areas. The training assures a basic understanding of facility operations and safety requirements. The General Employee Training program includes information necessary for each employee to understand the nature of the work done at our facility and to perform his or her job in a safe manner. The program currently in use contains the following elements:

1) Organization
2) Facility Description
3) Quality Control
4) Security
5) Industrial Safety
6) Radiation Fundamentals
7) Criticality Safety
8) Emergency Preparedness

All employees working in the Pellet Shop or whose job involves working with unclad nuclear material also participates in a Radiation Worker Training Program. This program covers radiation and criticality safety in more detail than presented in the General Employee Training Program. Further, there is an annual Radiation Worker Refresher Training Program in which employees participate. These programs were designed and developed following guidelines and training system development methods promulgated by the Institute of Nuclear Power Operations (INPO).

In addition to the above, if workers are required to perform tasks that involve unusual radiological conditions, they must do so under the guidance of a Radiological Work Permit (RWP). The RWP provides additional instructions to the workers that informs them of any special controls required in performance of the subject operations. Employees are required to read and sign the RWP prior to beginning the operation to indicate that they have read and understand the RWP requirements.

All formal training is concluded by employees being tested to establish their understanding of the material presented. Records of such testing are retained and and are available for your review, if you so desire.

Combustion Engineering, therefore, believes that our workers are being given adequate instructions in appropriate radiation protection procedures to perform assigned tasks.

Allegation No. 2:

Radiation Work Permits are not always issued for work activities where there is a potential for substantial uranium contamination and respiratory uptake.

Response:

Radiation Work Permits (RWP) are issued for work activities where there is a potential for substantial uranium contamination and respiratory uptake. Our Radiological Protection Instruction Number 204 (RPI-204), "Radiation Work Permit" indicates that RWPs are required for jobs that, when performed, are known to or have the potential to, expose individuals to higher that normal concentrations of airborne radioactive material. If there is any question whether a job requires an RWP or not, the final determination is made by the Supervisor, Radiation Protection and Industrial Safety.

Direct surveillance by qualified Radiation Protection personnel may be used in lieu of an RWP in an emergency situation. The Radiation Protection person in this situation has the authority to direct all matters associated with radiation protection and specifies the radiological requirements to control individual exposures to radiation and radioactive materials.

Combustion Engineering is not aware of any work activity requiring a Radiation Work Permit that was conducted without one.

Allegation No. 3:

Procedures regarding personnel contamination surveys are not always followed.

Response:

All personnel requiring access to the radiologically controlled area of the Nuclear Fuel Manufacturing facility are required to complete the General Employee Training and Radiation Worker Training programs. These programs specifically address the requirement that all personnel must conduct a whole body frisk when exiting a contaminated area. The training program also contains a demonstration of the proper conduct of personal frisking.

In addition, our Radiological Protection Instrumentation Number 209 (RPI-209) "Monitoring for Radiation and Contamination" contains the following requirements:

- All personnel are responsible for performing a proper exit frisk on themselves prior to leaving a contamination controlled area, and

- The Radiation Protection Technician in charge of the control area shall periodically monitor that individual perform the self-frisking check correctly prior to their leaving the controlled area, with closer monitoring during high traffic times.

Combustion Engineering believes that adequate training is provided and that adequate controls are implemented to ensure that essentially all personnel do in fact perform the required survey properly.

Allegation No. 4:

The bioassay program is not always effective in determining uptake. For example, there have been instances where no uptake was detected despite high nasal smears and high BZA results, suggesting a possible weakness in bioassay methodology.

Response:

The example cited by the allegation implies that because there are alleged "instances" of high air sample and high nasal smears, without resulting indications of uptake from bioassay results, that Combustion Engineering's bioassay program may be weak in bioassay methodology. It is well excepted, however, by the Health Physics community that high lapel air sample results or high nasal smears may not necessarily produce positive bioassay results.

It is noted that the allegation presents no facts concerning the "instances". If Combustion Engineering is to conclusively address allegations of high lapel air sample results and high nasal smears, it is necessary that we receive specific descriptions of the "instances". Further, since the number of "instances" has not been indicated, we are unaware of the statistical base upon which it has been concluded that our bioassay program has weaknesses in methodology. Based upon our continuing review of data obtained from our lapel air sampling and bioassay programs, we have no indication that suggests a weakness in bioassay methodology. On the contrary, correlations of data from in-vivo counting, urinalysis, fecal analysis, and air sampling implies that our bioassay program is effective.

Allegation No. 5:

Evaluation of radiation incidents does not always result in findings which reflect the actual root causes of the incidents.

Response:

The Windsor Nuclear Fuel Manufacturing facility has recently issued a procedure for reporting and correcting abnormal occurrences. Part of the corrective actions specified in this procedure includes requirements for root cause determination and, where warranted, identification of long term corrective action to prevent recurrence. Incidents which result in injury or potential injury to personnel, or damage to equipment, property or product, or events resulting in an immediate safety hazard (e.g., a spill or release of hazardous material) are specifically included under the Abnormal Event Occurrence Reporting System described above. This procedure replaces an interim abnormal event reporting system which was already in place. The newly issued procedure formalizes the root cause determination and permanent corrective action review process.

As a result, Combustion Engineering has increased confidence that abnormal occurrences, including radiation incidents, will be properly reported and corrective actions taken. Root cause determination and subsequent long term corrective action to preclude recurrence are part of this process and will be reviewed and approved by facility management.

COMBUSTION ENGINEERING

April 21, 1989

Mr. John J. Stanton, Jr.
Area Director
Occupational Safety and Health
Administration
Federal Building, Room 508
450 Main Street
Hartford, CT 06103

Re: Your letter of April 18, 1989

Dear Director Stanton:

Your letter of April 18, 1989 has reached my office, and I have investigated the allegation.

After checking with site medical, shop supervisors, security, health physics personnel logs, radiation and industrial safety personnel, and union representatives no reported cases of dizziness, nausea, and nosebleeds were reported by any of our employees. Further checking revealed no such instances in the pellet manufacturing as referenced in your letter.

While this does not correspond directly to the allegations, I did find one instance of an unreported nosebleed experienced by an inspector who was inspecting a fuel bundle assembly that had just come out of a deionized hot water (200°F) bath. This work is not in the pellet manufacturing shop. She told me that although she knew she was supposed to wait until the bundle cooled down, she went ahead with the inspection and that inhaling the hot air off the bundle, dried out her nose and it started to bleed. She denied any dizziness or nausea. She stopped the bleeding herself, did not report it, and went on with her work. She has been counseled to follow the normal procedure in the future and allow the bundle to cool before inspecting it and to report all such instances.

I also found an instance of an employee who was out of work for three days due to a headache. She maintained that the headache was brought on by her non-job related hypertensive condition and her failure to follow the medication schedule and dietary restrictions set by her physician. She did not report the matter.

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These are the only instances that occurred and none correspond fully with the allegations in your letter.

In the first instance, the employee has been counseled to follow the correct procedure and to allow the unit to cool before conducting a close proximity inspection.

The second instance is not related to any working conditions, and while it is hoped the employee will adhere to her doctor's instructions, we do not have any reason to interject ourselves into the matter.

In conclusion, I appreciate and share your concern for the safety and health of our employees.

Very truly yours,

Charles R. Waterman

Charles R. Waterman
Vice President & General Manager
Nuclear Fuel Manufacturing

CRW/lyn

APR 2 1 1989

Docket No. 70-1100

Combustion Engineering, Inc.
ATTN: Dr. P. L. McGill
Vice President - Nuclear Fuel Manufacturing
Nuclear Power Systems
1000 Prospect Hill Road
Windsor, Connecticut 06095-0500

Gentlemen:

This letter confirms the discussion between Mr. C. Waterman and Dr. W. Pasciak of this office on April 17, 1989, relative to the allegation that there are problems under NRC jurisdiction in your fuel manufacturing facility at Windsor. It is alleged that appropriate radiation protection controls are not being maintained, specifically that:

- Workers are not being given proper instructions in appropriate radiation protection procedures to perform assigned tasks.
- Radiation Work Permits are not always issued for work activities where there is a potential for substantial uranium contamination and respiratory uptake.
- Procedures regarding personnel contamination surveys are not always followed.
- The bioassay program is not always effective in determining uptake. For example, there have been instances where no uptake was detected despite high nasal smears and high BZA results, suggesting a possible weakness in bioassay methodology.
- Evaluation of radiation incidents does not always result in findings which reflect the actual root causes of the incidents.

If the matters described above are occurring as alleged, this indicates that your radiation protection program is not being fully implemented, and that the controls you have developed to assure such implementation are not effective. Alternatively, if the alleged programmatic deficiencies are incorrect or are based on misinformation and misperceptions, this suggests that your staff may not have assimilated training provided to them.

You are requested to look into this matter and, within 30 days of the date of this letter provide us with a written response that addresses each of the above allegations. Please call Mr. James Joyner (215) 337-5370 of my staff if you need further clarification on the issues described above.

Sincerely,

Original Signed By:

James Joyner

for Malcolm R. Knapp, Director
Division of Radiation Safety and
Safeguards

cc:
A. E. Scherer, Director, Nuclear Licensing
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:
Region I Docket Room (with concurrences)
Management Assistant, DRMA
Robert J. Bores, DRSS
J. Roth, DRSS
G. Bidinger, NMSS
M. R. Knapp, DRSS
M. A. Austin, DRSS
R. L. Nimitz, DRSS
M. Perkins, DRMA
J. Joyner, DRSS
W. Pasciak, DRSS
R. Bellamy, DRSS

RI:DRSS	RI:DRSS	RI:DRSS	RI:DRSS
Pasciak/slj	Bellamy	Joyner	for Knapp
4/17/89	4/17/89	4/20/89	4/21/89