

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/97-01

Licensee: General Electric Company

Facility: Nuclear Energy Production

Location: Wilmington, North Carolina

Dates: January 27 - 31, 1997

Inspector: G. L. Troup
Sr. Fuel Facilities Inspector

Accompanying Personnel: D. A. Ayres
Fuel Facilities Inspector

C. A. Blanchard
Fuel Cycle Inspector, Region III

Approved by: E. J. McAlpine, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

Enclosure

9703110301

EXECUTIVE SUMMARY

General Electric Nuclear Energy Production NRC Inspection Report 70-1113/97-01

This routine, announced inspection was focused on management controls, operations, training, review of previously reported events, status of the new DCF and follow-up on previous inspection findings. Back shift inspections were conducted on January 29 and 30. The inspection was focused on the safe operation of the facility.

Plant Operations

- Corrective actions to resolve the undocumented "idling" of process alarms have been completed and implemented.
- The licensee had implemented an effective program to control the keys for AECs, which is now covered by a document specifying how the program is to be implemented.
- The short-corrective actions necessary for restart of the calciners were satisfactorily completed. Two long-term actions remain to be completed.

Management Organization and Controls

- Persons appointed to positions described in the license application met the educational and experience requirements. Other persons were qualified for the position.

Maintenance/Surveillance

- The criticality monitoring system has been calibrated and functionally tested as required by the license and procedural requirements.
- New criticality monitors have been installed to provide adequate coverage of the facility and properly calibrated.
- Work is in progress to resolve previously identified problems with warning horns and the associated wiring circuits.

Training

- New employee nuclear safety training and refresher training have been adequately implemented in accordance with regulatory requirements.

DCF Project

- Facility construction is nearing completion. Testing of the instrumentation and control circuits has begun.

- The Hazards Analysis is complete. The licensee is implementing a readiness review for the facility prior to management approval of the final hazards list.

Attachments

Partial List of Persons Contacted
Inspection Procedures Used
List of Items Opened, Closed and Discussed
List of Acronyms

REPORT DETAILS

Summary of Plant Status

This report covers a one week period. During the period, fuel production and uranium recovery operations were running normally. Powder production operations were shut down on January 27 to resolve an identified problem with Plant Process Alarms in the chemical area which were found to be in the "idle" condition. This is discussed further in Paragraph 1.a.(1). Operation of the process lines resumed on January 30.

Construction activities for the new powder production facility (DCF) were progressing. Pre-operational activities, such as instrumentation and control system loop checks and continuity checks had begun.

A new warehouse and refurbishment facility for shipping containers has been completed and released for use.

No other NRC inspections occurred during this period.

1. Plant Operations (03) (88020)

a. Implementation of Process Safety Controls (03.03)

(1) Process Control Alarms

(a) Inspection Scope

The inspector reviewed the licensee's investigation into the cause of certain process alarms be in the "idle" mode and the corrective actions taken.

(b) Observations and Findings

On January 28, 1997, licensee representatives informed the inspector of a condition concerning inoperable alarms on the chemical systems. On January 24, a "flame out" had occurred on a calciner. The introduction of process gases was stopped by an Active Engineered Control (AEC), but an alarm did not activate to alert the operator so feed material continued to be fed to the calciner.

The initial investigation revealed that the Plant Process Area (PPA) alarms were in the "idle" condition rather than "operate" or "active." Management became aware at this time that the alarms could be accessed through the control system key board by typing several functions or "commands" without the need for a password or supervisory approval (this is how the system was set up rather than some anomaly).

Normally, the control system is accessed through "Tune Mode," which requires written approval and documentation. After this particular PPA alarm was returned to "operate," other PPA alarms were checked. Of the remaining 17 PPAs in the chemical area, all were found in the "idle" state. All process lines were shut down until the effect of the alarms being in "idle" could be determined.

As part of the investigation it was determined that placing alarms in "idle" did not affect any of the controls for safety interlocks, AECs or signals which activated an alarm requiring operator response (OARs). The PPA alarms were determined to be alarms which informed the operator of an off-specification condition, but which did not affect automatic controls. However, there was no indication on the control console screen that the PPA alarms were in "idle." When the process lines were last shut down, the alarms were apparently placed in "idle" to avoid nuisance alarms, such as a "low temperature" alarm when a calciner was cold.

After it was determined that placing PPA alarms in "idle" did not affect any of the safety controls, it was decided to change the program to require formal approval to place PPA alarm in "idle" and to document such a condition. A Software Service Request (SSR) was approved by the system owner and the software engineer on January 29 to place the PPA under Tune Mode control, such that written approval on the Tune Mode form is required and the Area Coordinator has to release the console key to make the change. Completion of the activity and return to "normal" is also documented. Operating Procedure (OP) 1010.01 was revised and approved on January 29, 1997, to require that, prior to start-up, the Process Management Area and PPA alarms had to be verified as "on" or "operate" or "active" (must not be in "idle" before start-up) and any changes had to be processed under the "Tune Mode" control system.

Following revision of the OP and training of the operators, the systems were released for operation and were operating normally by January 30, 1997.

(c) Conclusions

While placing PPA alarms in "idle" did not override or shut down any safety functions, the shut down of the process lines until the condition could be evaluated was a proper safe act.

Changes to the process control system were initiated and approved in accordance with plant procedural requirements.

2. AEC Key Control

(a) Inspection Scope

The inspection consisted of a review of procedural controls established for the control of keys used for positive control over Active Engineered Controls (AECs).

(b) Observations and Findings

The control of AEC keys was reviewed in Inspection Report (IR) 70-1113/96-11. The inspector determined that the licensee had adequate controls for the keys, but there was no procedure which specified how the key control program was to be implemented.

Licensee personnel stated that they initially considered issuing the controls as a Nuclear Safety Instruction (NSI). However, NSIs are used only by Nuclear Safety personnel and personnel in other departments are active participants with the keys.

On January 28, 1997, a Section Administrative Routine (SAR) was issued jointly by Manager, Chemical Product Line and the Manager, Fuel Fabrication Product Line. SAR 350-36, Rev. 0, "Key Control" describes how personnel are to obtain, use and return keys for AECs.

(c) Conclusions

The inspector concluded that the issuance of the SAR satisfactorily implemented the administrative controls for AEC keys.

b. Review of Previous Events (03.07)

(1) Inspection Scope

The inspector reviewed the licensee's corrective actions resulting from the failure of the tube in the Line 3 calciner.

(2) Observations and Findings

The Line 3 calciner tube failure reported to NRC on December 3, 1996, and reviewed in NRC IR 70-1113/96-12, prompted the licensee to consider a number of long- and

short-term corrective actions to preclude a similar event. These corrective actions were documented by letter to Director, Division of Nuclear Materials Safety, Region II, dated December 11, 1996. Attachment III of the letter lists nine corrective actions, the first five of which were to be completed prior to restarting each calciner. The corrective actions were listed in Attachment III of the letter as follows.

1. Tighten tolerance on tube rotation limit switch.
2. Enhance the isolation of ADU to the calciner.
3. Correct weaknesses in calciner stack monitoring data reporting.
4. Modify control system to require weekly calciner stack result input.
5. Evaluate and formalize preventive maintenance program for calciner tubes.
6. Revise Criticality Safety Analysis of the "tube break" accident condition.
7. Revise vendor specification for rolled alloy calciner tubes.
8. Revise change control process to emphasize impact of construction material changes.
9. Evaluate new technology to gamma-scan uranium within calciner annulus.

Corrective action No. 1 was to be implemented by adjusting the timer settings on the switches that monitor calciner tube rotation. Corrective action No. 2 was to be implemented by installing an electrically actuated three-way valve to divert the calciner wet ADU feed to a recirculation loop upon loss of tube rotation on lines one through four. Corrective action No. 2 also included automatically stopping dry, recycle material feed to the calciner upon loss of tube rotation on lines one through five. The inspector reviewed the calciner restart checklists and results of the functional tests for lines one through five. The inspector also observed the presence of the three-way valves installed in the calciner wet ADU feed system. The inspector found that corrective action No. 1 and corrective action No. 2 for

wet ADU feed were documented as being completed and tested on or before December 12, 1996. The documentation also showed that corrective action No. 2 for dry feed was completed and tested for lines one through five on or before January 22, 1997.

Corrective action No. 3 was to be implemented by modifying ProVox to check for calciner stack emission results above a predetermined action level. If an elevated result is detected, ProVox was to prompt the control room operator to contact maintenance and ask the control room operator for a maintenance work order number. The inspector reviewed the calciner restart checklists for lines one through five and found that for those process lines, corrective action No. 3 was documented as being completed on or before December 6, 1996.

Corrective action No. 4 was to be implemented by modifying the ProVox system such that weekly calciner stack results for lines one through five had to be entered into the system to allow the calciners to continue to operate. The inspector reviewed the calciner restart checklists and results of functional tests and found that corrective action No. 4 was documented as being completed for lines one through five on or before December 12, 1996.

Corrective action No. 5 was to be implemented by entering an automatic prompt in the MPAC system to alert the maintenance planners of the need for preventive maintenance based on material throughput for each calciner tube on lines one through five. The inspector observed the text of the prompts on the MPAC system, reviewed the memo documenting rationale for frequency of preventive maintenance, and reviewed the calciner restart checklists. The inspector found that corrective action No. 5 was documented as being completed on or before December 10, 1996.

Corrective action No. 6 was to be implemented by explicitly modeling material accumulation within the calciner annulus beyond a 25 kilogram hemisphere previously analyzed in the criticality safety basis and by evaluating the addition of a new mass/moderation parameter control to the existing basis for safety. As of the inspection dates for this report, this item had not been completed, but was expected to be completed during February 1997.

Corrective action No. 7 was to be implemented prior to the next purchase of calciner tubes by specifying a final stress-relief annealing step, and to assure that vendor quality assurance certifications meet this new requirement.

As of the inspection dates for this report, this item had not been completed and was not expected to be completed in the near future since no new tubes were expected to be ordered.

Corrective action No. 8 was to be implemented by revising the change control process with an emphasis on the impacts of material property changes associated with changes in process equipment. As of the inspection dates for this report, this item had not been completed, but was expected to be completed during February 1997.

Corrective action No. 9 was to be implemented by evaluating a new technology for potentially detecting uranium accumulation within the calciner annulus via an exterior gamma-scan device. The inspector reviewed an internal memorandum dated January 24, 1997, from the licensee's radiation monitoring function explaining the difficulties that would be encountered in implementing a system for this type of measurement. Based on the content of the memorandum and discussions with licensee management, the inspector found that the use of a system to directly measure material accumulation in the calciner annulus would not be pursued further. This corrective action was considered to be completed as of the memorandum date.

(3) Conclusions

The short-term corrective actions necessary for restart of the calciner units were all completed for lines one through five. The calciner in line six was in an indefinite shut down mode due to the scavenging of its parts for the other units. The line No. 6 calciner can not be restarted until all applicable corrective actions have been implemented for it. The status of this unit will be followed until it is restarted or removed from service.

Long-term corrective action No. 9 was completed. Implementation of corrective actions six and eight were underway and will be followed until their completion. Corrective action No. 7 is conditional upon the purchase of new calciner tubes and may not ever be completed due to the expected phasing out of wet ADU processing. The status of corrective action No. 7 will be followed until it is implemented or the wet ADU process equipment is removed from service.

(Record Note: Subsequent to the end of the inspection, the licensee informed Region II that the purchase specification was revised on February 14, 1997).

2. Organizational Structure (05.01) (88005)

a. Inspection Scope

The inspector reviewed changes in the organization since the last inspection, especially as they apply to positions described in the license application.

b. Observations and Findings

A new Manager, Environment, Health and Safety (EH&S) was appointed and assumed his responsibilities on December 18, 1996, following completion of a training program. The Manager, GE-NE Quality, who had been acting in the EH&S position as well as the Quality position, resumed his Quality function full-time.

The former Manager, Fuel and Chem Lab Quality, accepted a position in another part of General Electric. On January 31, 1997, it was announced that the Team Leader, Uranium Recovery (URU), had been selected to be the Manager, Fuel and Chem Lab Quality. An acting Team Leader, URU was also appointed. These positions are not specifically described in the license application.

Chapter 2, section 2.5.2 of the license application describes the license application describes the functions and qualifications for the position Area Manager. P/P 40-16, "Nuclear Safety - Area Manager Responsibilities and Assignments" assigns each Area Manager for the plant areas. The inspector reviewed the changes for four Area Managers and determined that those appointed met the qualifications specified in the license application.

The Fuels and Facility Licensing group has developed an indoctrination program for new Area Managers. This program covers the responsibilities and functions as defined in the license application and P/P 40-16. The inspector reviewed the records and determined that all new Area Managers had completed the indoctrination program. This program was also presented to existing Area Managers in February and March, 1995.

c. Conclusions

Persons appointed to positions described in the license application met the educational and experience requirements. Other persons were qualified for the position.

The implementation of the new Area Manager indoctrination program is a positive step to assure that the new managers are aware of their responsibilities.

3. Calibration of equipment (F1.07) (88025)

a. Inspection Scope

The inspector reviewed the criteria for the installation of nuclear criticality detectors in a new facility and the calibration of existing monitors.

b. Observations and Findings

Procedure NSI-0.4.0 specifies the requirements for the annual energy calibration of the nuclear criticality monitoring system detectors. The inspector reviewed the records for the calibration performed December 3 through 5, 1996, and confirmed that all detectors performed within specified limits. Also, all portable units (SRM-100s) responded within specified limits.

Included in the review of the criticality system annual calibration were four new detectors installed in the new warehouse area. The new detectors were visually observed by an inspector, and the placement and orientation of the detectors within the new warehouse was reviewed with the licensee. The inspector reviewed licensee's diagrams as evidence of redundant coverage by the criticality detectors of all areas in the new warehouse. The inspector also reviewed previous calculations which demonstrate adequate coverage for detectors up to 250 feet from a criticality accident with no obstructions or shielding.

The inspector also reviewed the monthly test records for the criticality monitoring system for the period September 1996 through January 1997, and determined that the system responded within specified limits.

c. Conclusions

The inspector concluded that existing criticality monitors had been properly calibrated and functionally tested, and that the new monitors had been properly located to provide coverage in the new warehouse.

4. 10 CFR 19.12 Training (F2 01) (88010)

a. Inspection Scope

The inspector attended the annual radiation workers' refresher training, reviewed new employee training, and verified training instructor's qualifications. In addition, the inspector interviewed workers to ensure training efforts were effective in meeting licensee and regulatory requirements.

b. Observations and Findings

Chapter 2, Section 2.6 of the license application requires new employees to complete nuclear safety training and pass an examination prior to being granted unescorted access to the controlled area. Previously trained employees are required to be retrained every two years, in accordance with Practices and Procedures (P/P) 40-17, "Nuclear Safety - Training." Additionally, 10 CFR 19, Section 19.12 requires that all individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 mrem shall receive instruction in various topics.

The inspector reviewed the new employee training course materials to determine if they met the new employees course objectives. Contents of this course included:

- clear and concise course objectives;
- illustrations of evacuation routes for fire and criticality accidents throughout the process building;
- requirements and the rights of workers enforced by NRC codes;
- detailed review of NRC Form 3;
- procedures for dosimetry monitoring and method for obtaining a worker's dose;
- criticality factors and safety issues;
- proper uses and wearing of safety equipment to ensure radiological protection;
- showed and discussed radiation precautionary procedures;

A comprehensive final examination consisting of 75 questions was administered at the end of the course. The inspector reviewed the test results from the January 7 and 14, 1997 classes and found that all students had passed the class.

The inspector attended the 1997 radiation workers' refresher training (NSR97) course. The inspector observed that the instructors used several different teaching methods during this course. These instruction methods included:

- simulation of an artificial criticality accident;
- short video of the new UF_6 to UO_2 powder conversion process and the correct method for egress from the production facility during a criticality emergency;
- class exercises in following written instructions;
- demonstration of how criticality factors affect the chances of a criticality accident;
- identifying incorrectly worn safety clothing and house keeping techniques by a worker;

The licensee administrated a self graded quiz consisting of ten true or false questions at the end of the class, which was used as a training tool by discussing the answers while the students "graded" their test. However, the inspector's consultation with several employees, following this course, showed a general knowledge for nuclear safety, radiological protection, and the issuance of emergency procedures.

The licensee manages the training records and dosimetry results for workers on a computer program. This program data was current. Several new employees who received the new employee training on January 14, 1997, had been entered in this computer database at the time of the inspection. The inspector discussed with the training coordinator and found that this computer program has been used to determine required training efforts and ensured that employees training requirements have been kept current.

The inspector also review the letters from nuclear safety and radiation protection approving various persons as instructors for the classes, as specified in Chapter 2, section 2.6 of the license application.

c. Conclusion

The licensee training program meets the requirements of the license and NRC regulations. The licensee's computer program used for training and dosimetry was adequate for retaining and managing training needs of employees. Additionally, the new employee training seemed comprehensive and effective in meeting course objectives.

5. DCF Project Facility Status (T1.01) (88020)

a. Inspection Scope

The inspector reviewed the status of the facility with licensee representatives.

b. Observations and Findings

During tours of the DCF and the existing plant areas, the inspector observed the status of construction of the process lines as well as the modifications to permit the movement of powder containers through plant areas. As the powder from the DCF will be moved in bulk containers, facility modifications are being made to provide for "moderation restriction" areas in existing process areas. The removal of existing structures and equipment to permit construction of moderation restriction transfer areas is addressed by the licensee's transition plan. The installation of the edge seal and trim for the outer membrane of the roof is not yet completed.

The inspector observed that the piping systems and instrumentation is being completed and the lines turned over from the constructor. Instrumentation checks were in progress during the inspection in preparation for functional testing.

The inspector discussed the status of the various technical documents for the facility with licensee management. Technical reports and operating procedures are still in "draft," but are nearing the point where they can be reviewed by the NRC. The Hazards Analysis is complete and resolution of findings is in progress. A summary of the analysis will be submitted to the NRC in February. There are some findings which are considered "moderate risk" which may not be corrected. These will be submitted to the Wilmington Safety Review Council for review and approval. Licensee management informed the inspector that this review has been delayed until after a readiness review is conducted internally by several teams.

c. Conclusions

Work on the transition phase between the DCF and existing production facilities is progressing.

Construction of the DCF systems is complete for the first line and preoperational check-outs have begun.

6. Follow-up on Previous Inspection Findings (G1) (92701)

a. (Closed) IFI 96-09-01

This IFI concerns the revision of the training for individuals who are designated a "qualified reviewer." A qualified reviewer determines the need for review by the functions in the Environment, Health and Safety group for new or revised operating procedures and temporary instructions.

Corrective actions were identified during the exit interview for IR 70-1113/96-09. The inspector reviewed the implementation of these actions.

These changes were implemented during the last training class for qualified reviewers which was conducted in October, 1996. Individuals who attended the course on an "audit" basis were clearly identified in the class records. Five examinations were administered for the topics covered. Each set of examinations was graded by the applicable safety function.

P/P 10-09, "Operating Procedures (OPs)- FMO," Rev. 2, was issued on January 31, 1997. The inspector reviewed the P/P and determined that the corrective actions discussed in IR 70-1113/96-09 had been incorporated.

This IFI is closed.

b. (Open) IFI 96-11-07

This IFI concerns the long term corrective actions for the criticality warning system horns. The licensee's investigation resulting from incident report ChPL 9649 identified five long term actions to correct identified problems in the system.

The inspector discussed the status of these actions with the responsible supervisor. Two of the actions are in progress. (evaluate horn audibility and update system drawings) are in progress. The remaining three items require completion of the first two items. Temporary Operating Instruction A-3647 was issued to conduct the identification and documentation of the horns. Verification and marking of the horns has been completed for one of the nine loops.

This IFI remains open pending completion of the long term corrective actions.

c. (Closed) NCV 96-11-02

This NCV resulted from the loss of geometry control in the URU Exhaust Scrubber Sump (T-965). Corrective actions were not complete at the conclusion of the inspection. The inspector reviewed the corrective actions taken to correct this problem.

A third set of stays was installed to maintain the dimension of the tank. Following installation of the stays, the internal dimensions were checked using the ultrasonic method on October 23, 1996. One measurement was 4.55 inches, which was greater than the design value of 4.5 inches. However, a revised nuclear criticality safety analysis had demonstrated that a dimension up to 5 inches was acceptable. Nuclear Safety evaluated this condition as acceptable.

The drawing of the tank was revised to reflect the "as built" condition.

Actions on this NCV are closed.

7. Exit Interview Summary (M1)

On January 31, 1997, the inspection scope and findings were summarized with licensee representatives. The inspector discussed in detail the areas inspected, the findings and concerns which had been identified. There were no dissenting comments expressed by licensee representatives.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

*M. Chilton, Manager, Joint Conversion Project
*S. Dale, Team Leader, Compliance Auditing
T. Flaherty, Manager, DCP Operation
*R. Foleck, Sr. Licensing Specialist
*J. Kline, Manager, Powder Product Line
*A. Mabry, Program Manager, Radiological Safety
*C. Monetta, Manager, GE-NE Environment, Health and Safety
S. Murray, Team Leader, UO₂ Production Team
*L. Paulson, Manager, Nuclear Safety
*R. Reda, Manager, Fuels and Facility Licensing
G. Smith, Team Leader, FMO Maintenance Support
C. Tarrer, Team Leader, Configuration Management and ISA
*K. Theriault, Team Leader, Uranium Recovery/Process
C. Vaughan, Project Manager, EH&S - New Facility Licensing/Safety
C. Williams, Team Leader, Waste Treatment

* Attended exit meeting on January 31, 1997.

INSPECTION PROCEDURES USED

IP 88005 Management Organization and Control
IP 88010 Operator Training/ Retraining
IP 88020 Operations Review
IP 88025 Maintenance/ Surveillance Testing
IP 92701 Follow-up on Inspector Problems

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

<u>Item Number</u>	<u>Type</u>	<u>Description</u>
96-09-01	IFI	Follow-up on revisions to "Qualified Reviewer" training
96-11-02	NCV	Final actions on loss geometry control in a slab tank

Discussed

96-11-01	IFI	Follow-up on long term corrective actions for criticality system warning horns
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LIST OF ACRONYMS

AC	Area Coordinator
AEC	Active Engineered Control
CFR	Code of Federal Regulations
ChPL	Chemical Product Line
CR	Change Request
CSA	Criticality Safety Analysis
DCF	Dry Conversion Facility
DCP	Dry Conversion Project
EH&S	Environment, Health and Safety
EN	Event Number
FMO	Fuel Manufacturing Operation
FTI	Functional Test Instruction
GE-NE	General Electric- Nuclear Energy
GE-NEP	General Electric- Nuclear Energy Production
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IR	Inspection Report
ISA	Integrated Safety Analysis
KGS	Kilograms
MC&A	Material Control and Accountability
NCS	Nuclear Criticality Safety
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSI	Nuclear Safety Instruction
NSR/R	Nuclear Safety Requirements/Release
ONMSS	Office of Nuclear Materials Safety and Safeguards
OP	Operating Procedure
PA	Public Address
PMA	Plant Management Area
PPA	Plant Process Area
PPM	Parts Per Million
P/P	Practices and Procedures
Rev.	Revision
RP	Radiation Protection
SAR	Section Administrative Routine
SNM	Special Nuclear Material
SSR	Software Service Request
STR	Shift Technical Resource
UCON	Uranium Conversion
UIR	Unusual Incident Report
UO ₂	Uranium Dioxide
URU	Uranium Recovery Unit

REGION II
RITS AUDIT REPORT
DATA THROUGH 02/15/97

SITE: GENERAL ELECTRI
REPORT NO.: 97001
INSPECTOR: END DATE: 01/31/1997
LEAD INSPECTOR: GLT

EMPLOYEE *****	WEEK ENDING *****	DOCKET NO. *****	PROCEDURE NO. *****	IPE CODE ****	IMI CODE ****	REGULAR HOURS *****	NONREGULAR HOURS *****	PROCEDURE STATUS *****	
DAAYRES	01/25/1997	07001113		APP	IRAD	0.0	2.0		
		07001113		AT	IRAD	9.0	8.0		
		07001113	88010	CO	IRAD	2.0	0.0	P	
		07001113	88020	CO	IRAD	32.0	0.0	P	
		07001113	88025	CO	IRAD	1.0	0.0	P	
	02/15/1997	07001113		APP	ITNG	4.0	0.0		
	EMPLOYEE TOTAL>>						48.0	10.0	
	GLTROUP	01/25/1997	07001113		APP	IRAD	8.0	0.0	
			07001113		APP	IRAD	0.0	1.0	
			07001113		AT	IRAD	7.0	0.0	
07001113			88005	CO	IRAD	2.0	0.0	M	
07001113			88010	CO	IRAD	2.0	1.0	M	
07001113			88020	CO	IRAD	26.0	5.0	M	
07001113			88025	CO	IRAD	2.0	0.0	M	
07001113			92701	CO	IRAD	1.0	0.0	M	
02/08/1997			07001113		APP	IRAD	6.0	0.0	
07001113			APP	IRAD	6.0	0.0			
EMPLOYEE TOTAL>>						60.0	7.0		
REPORT TOTAL>>						108.0	17.0		

I HAVE REVIEWED THE ABOVE DATA AND TO THE BEST OF MY KNOWLEDGE THE TIME ALLOCATIONS FOR REPORT (GENERAL ELECTRI / 97001) ARE ACCURATE AND REFLECT WHAT IS DOCUMENTED IN THE INSPECTION REPORT

LEAD INSPECTOR SIGNATURE & DATE:  2/27

BRANCH CHIEF SIGNATURE & DATE: 

RETURN TO IMS after report is issued.

Need IFS forms

MATERIALS INSPECTIONS

REGION: 2

INSTITUTION: General Electric

RPT. NBR.	DOCKET NBR.	LICENSE NBR.	LST. INS.
<u>9.7.0.0.1.1</u>	<u>0.7.0.1.1.1.1.3</u>	<u>SNM-1097</u>	<u>1</u>
	<u>1.1.1.1.1.1.1</u>		<u>1</u>
	<u>1.1.1.1.1.1.1</u>		<u>1</u>

REPORT TRANSMITTAL: 20297
 RESPONSIBLE ORG.: 214110
 LEAD INSPECTOR (RITS INITIALS): GILIT
 591 (Y/N): N
 LETTER (Y/N): Y
 CLEAR (Y/N): Y

MATERIALS/FUEL FACILITIES ITEMS

UPDATE INFORMATION (Y/N): 1

SEQUENC. NBR.	ITEM TYPE	SEVERITY	SUPPLEMENT
A	STS: <u>1</u>	UPD I/R: <u>1.1.1.1.1.1.1</u>	ACTUAL CLOSEOUT: <u>1/1</u>
	CFR: <u>1</u>	LICNS COND: <u>1</u>	TIE DOWN: <u>1</u>
B	STS: <u>1</u>	UPD I/R: <u>1.1.1.1.1.1.1</u>	ACTUAL CLOSEOUT: <u>1/1</u>
	CFR: <u>1</u>	LICNS COND: <u>1</u>	TIE DOWN: <u>1</u>

TITLE: _____

CONTACT EMP: 1.1.1 CAUSE CODE: 1.1

EA NUMBER: 1.1.1.1.1.1 NOV ID: 1.1.1.1.1.1 NOV ISSUE: 1/1

ITEM TEXT: _____

OPTIONAL FIELDS EXCEPT FOR "ACTUAL CLOSEOUT DATE" WHEN LISTING A STATUS OF "C" OR "W".

"SEVERITY", "SUPPLEMENT", AND "NOV/NOI ISSUE DATE" ONLY APPLICABLE TO ITEM TYPES "V10" OR "EE1". "EA NUMBER" ONLY APPLICABLE TO ITEM TYPES "V10" OR "EE1" WHERE "SEVERITY" IS 1, 2, 3, OR 4 (ESCALATED).

"NOV ID" ONLY APPLICABLE TO ITEM TYPE "V10" THAT CONTAIN AN EA NUMBER.

ONE LINERS FOR FEBRUARY 28, 1997

1. Fuel Facilities Status

a. Babcock and Wilcox (B&W) - NNFD

There were no reportable events during the last two weeks.

Routine manufacturing and maintenance activities are being conducted in the Modified Fuel Process (MFP), Advanced Fuel Process (AFP) and the Research and Test Reactor Fuel Element (RTRFE) portions of the plant. The uranyl nitrate hexahydrate (UNH) conversion process, used to produce U_3O_8 for use as RTRFE feedstock, remains shut down due to mechanical problems with sintering ovens. Routine development work is being conducted in the Compact Reactor Fuel (CRF) facility.

A routine Naval Reactors recovery campaign is being conducted in the Uranium Recovery Facility. Modifications to the Sapphire downblending facility have been completed and downblending operations have resumed. The further dissolution of Sapphire materials remain on hold.

Bill Brach, Deputy Director, Division of FCSS, Mike Weber, Chief, Licensing Branch, and Ed Flack, NNFD Project Manager, were onsite February 24 and 25 to tour the facility and meet with licensee management.

Bill Tobin, RII, DNMS, was onsite February 25-28 for routine physical security inspection activities.

b. B&W Fuel Co. (Framatome Cogema Fuel)

There were no reportable events during the last two weeks.

Routine rod loading and production activities are being performed on two 8-hour shifts. Routine decontamination and refurbishment activities are being conducted in the SERF facilities.

A CAL preventing the further downloading of NUKEM fuel assemblies remains in effect. A second shipment of NUKEM fuel assemblies remains at Norfolk, Virginia. The CAL had to do with the loss of a fuel assembly. The enforcement action for their accidental shipment of fuel to Germany will be issued on March 4 (see attached enforcement notice).

In addition to Scott Wilkerson being named as Manager of Manufacturing, Mike Minor has been named Manager of Manufacturing Engineering and Jeff Whitt has been named Manager of Facilities and Tooling Design.

B/41

Mike Weber, Chief, Licensing Branch, Division of FCSS, and Ed Flack, Project Manager, were onsite Monday, February 24, to tour the facilities and meet with licensee management.

Bill Tobin, Region II, DNMS, was onsite February 24 for routine physical security inspection activities.

c. General Electric NEP

There were no reportable events during the past two weeks.

All five lines are running on routine powder production. Line 5 is running HiE recycle from Uranium Recovery. Only lines 3 and 5 are operating over the week-end for HiE powder. Rods and bundle assembly are working 5 days a week.

The second process line in the Dry Conversion facility was turned over by the constructor this week. Heat up of the kiln is being done with the manufacturer's representatives on site.

The Decontamination and Volume Recovery Facility (DVRF) started operations this week using high pressure washing to remove contamination on cans. The compactor has not yet been put in service.

On February 12, the incinerator loading ram was bent, which shutdown incinerator operations. The ram was repaired (bent shaft on ram) and the incinerator is back in service.

d. Nuclear Fuel Services, Inc.

During the week of February 24 the licensee received its second shipment of UF_6 cylinders from the U. S. Enrichment Corporation Gaseous diffusion Plant in Portsmouth, Ohio. The second shipment of the 26 Type-5 B containers arrived without incident. After approval from the NRC, the licensee will recover the residual high-enriched material in the cylinders.

The licensee continues to process the HEU material shipped from the DOE facility in Rocky Flats with no significant problems. The licensee was making preparations to commence excavation activities for source term removal in the North Site area. Some of the preparation includes the relocation of the security fence. The licensee is waiting for approval to commence North Site remediation activities from NRC.

e. Westinghouse - Commercial Nuclear Fuel Plant

Conversion Lines 1 and 5 are processing uranyl nitrate while Lines 2-4 are processing UF₆ gas on a normal "just-in-time" schedule. Pelleting, rod loading, URRS, IFBA, and the mechanical area are all operating on a normal schedule. No reportable problems have been noted during the past two weeks.

An operations inspection was completed this week and no violations were noted. An NCV was identified for failure to have a preventive maintenance checklist or procedure for inspection of a high-high level control and alarm on the boilers that supply steam for the conversion process. The level control was being checked annually by a contractor as required by the PM schedule but there was no procedure, as specified by the license application, for this maintenance item.

The first shutdown for 1997 will start March 31 and will involve a physical inventory on April 1 and 2. Maintenance will also be performed.

2. North Anna Independent Spent Fuel Storage Installation

DNMS is in the final stages of preparation of an integrated inspection plan for the construction of the North Anna Independent Spent Fuel Storage Installation. Coordination of the plan has been accomplished within Region II and is currently being coordinated with NMSS prior to submittal to the Regional Administrator and forwarding to the program offices. Finalization of the plan is targeted for next week. It is anticipated that the licensee will begin construction of the storage pad in April of 1997.

3. National Hospital Medical Center

On February 27, 1997, a National Hospital Medical Center staff member notified Region II of the receipt of a contaminated radiopharmaceutical package. The package originated at Syncor nuclear pharmacy located in Silver Springs, Md. A State of Maryland (Maryland is an Agreement State) inspector responded to Syncor and did not find that either the driver, the truck used to convey the package, or the facility was contaminated. Region II staff will conduct a special inspection at the Medical Center to follow up on the event. Attached is PNO-II-97-011 which further describes the event.

4. Navy

On February 28, 1997, Region II received a request from the Secretary of the Navy Radiation Safety Committee regarding attendance at a briefing for Mr. Kazuyoshi Umemoto, Director of the Japan-United States Security Treaty Division, on March 4, 1997. The subject of the briefing is the December, 1995/January, 1996 unauthorized firing of depleted uranium munitions by a Marine aircraft at an Air Force gunnery range on a remote

island 50 nautical miles west of Okinawa, Japan. Mr. Umemoto has requested that representatives from the Department of Defense, Navy and the NRC be present at the briefing. The DoD representative characterized the meeting as a low key, informal briefing involving staff level personnel to answer any questions Mr. Umemoto has regarding the incident and possibly the NRC's oversight of the Navy's license. Region II is considering sending the Navy Master Material License Program Manager to attend the meeting.

5. Professional Service Industries, Inc.

An enforcement panel was held on February 26, 1997, to review the violations identified during the AIT inspection on November 13-21, 1996. The panel determined that escalated enforcement action should be taken based on the licensee's lack of management oversight that led to a programmatic breakdown regarding training, and equipment and dosimetry use. The licensee will be requested to provide actions that will correct the violations at all of PSI's NRC licensed offices.

6. Dr. Vazquez Eye Applicator Misadministration Records Search

During March 3-7, 1997, H. Bermudez, Region II assisted by J. Ibarra, AEOD and V. Ibarra, ADM will search 600-700 (Spanish) patient records, from the estate of Dr. Vazquez, to identify Sr-90 eye applicator misadministrations.

ONE LINERS FOR MARCH 14, 1997

1. Fuel Facilities Status

a. Babcock and Wilcox (B&W) - NNFD

Routine manufacturing and maintenance activities are being conducted in the Modified Fuel Process (MFP), Advanced Fuel Process (AFP), and Research and Test Reactor Fuel Element (RTRFE) portions of the plant.

A routine Naval Reactors recovery campaign is being conducted in the Uranium Recovery Facility. The uranyl nitrate hexahydrate (UNH) conversion process, used to produce U308 for use as RTRFE fuel, is operating normally.

The licensee has resumed limited operations of the Sapphire downblending facility after a spill occurred on March 4. A preliminary investigation of the spill has been completed and a more thorough root cause analysis is due within 30 days.

A meeting was held on March 10 in HQs between the licensee and ONMSS staff to discuss NNFD's industrial waste landfills decommissioning.

Five ONMSS staff members, including Mike Weber, Chief of the Licensing Branch, will be on site March 18-20 for a quarterly safeguards licensing visit and to observe the annual security tactical exercise.

b. B&W Fuel Co. (Framatome Cogema Fuel)

Routine rod loading and production operations are being performed on two 8 hour shifts. Routine decontamination and refurbishment activities are being conducted in the SERF facilities.

The CAL preventing further downloading of NUKEM fuel assemblies remains in effect. A second shipment of NUKEM fuel assemblies remains at Norfolk, Virginia.

A three member inspection team is scheduled to be on site March 25-27 to determine if the licensee has implemented corrective actions sufficient to prevent a repeat the inadvertent shipment of fuel assemblies. The team will be comprised of 2 ONMSS inspectors and the NNFD resident inspector.

c. General Electric - NEP

On March 7, GE reported that two BU-J shipping containers received from ENUSA as "empty" actually contained uranium oxide. A third container was found after the initial notification. The three containers have been sealed and are quarantined pending resolution

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with ENUSA. (see attached morning report)

On March 11, while working on connecting the criticality monitoring system in the Dry Conversion Facility (DCF), a mechanic placed one unit ("DAMS") in "maintenance" mode to replace a faulty I/O electronics board. When he pulled the board, the criticality monitoring system for the Fuel Manufacturing Operation alarmed. Personnel evacuated the building, including the radiological controlled areas. GE determined by monitoring the system panel and taking radiation surveys that a criticality had not occurred and allowed workers to return to their jobs. Surveys were conducted in the staging areas and evacuation routes; no contamination was found. DCF remained quarantined while the cause of the alarm was investigated. There was no SNM in the DCF. Boards in the existing DAMS can be removed in "maintenance" mode. However, the new DAMS were found to have a master relay circuit which acts as a power failure circuit. When the board was pulled, the relay acted as if a power failure had occurred and tripped the alarm circuit. GE is reviewing the system with Eberline to develop a procedure to replace boards without activating the alarm circuit or taking the entire system out of service.

The State of North Carolina issued a license amendment on March 11 to permit GE to process natural uranium in the DCF. The processing of enriched uranium will require the NRC license renewal to be issued.

Two of the ADU lines are scheduled down. Two ADU lines are operating and the recycle lines are completing a powder recycle campaign (about 5,000 kilograms). While the powder recycle campaign is in progress, solvent extraction is down. The ceramics area is operating three shifts, 5 days a week. Bundle assembly is working 2 shifts, 5 days per week.

There has been a problem with powder, especially on the HiE material. Two investigation teams are working on the cause. The problem may be due to air in leakage in the powder mill which is causing oxidation of the powder. This caused a powder shortage to the ceramics area.

There is a seven-member inspection team (NRR Vendor Branch and contractors) on site this week conducting a fuel quality and engineering inspection.

GE will start a Readiness Review for the DCF using three teams. The teams will include people from other GE facilities and contractors.

d. Nuclear Fuel Services, Inc.

On March 12, 1997, the licensee received its fourth shipment of UF₆ cylinders from the U. S. Enrichment Corporation Gaseous

Diffusion Plant in Portsmouth, Ohio. The shipment of the Type-5 B containers arrived without incident. After approval from the NRC, the licensee will recover the residual high-enriched material in the cylinders.

The licensee continues to process the HEU material shipped from the DOE facility in Rocky Flats on schedule. NFS has completed processing approximately 50% of the UNH. The licensee has been processing about 225 liters of UNH per week (40 kg), or about 5 of the 11 liter bottles per day. There have not been any problems to date in the processing, other than routine maintenance. The new Part 20 regulations has forced NFS to pay greater attention to minimizing airborne concentrations of uranium, particularly after the calcining operation. NFS anticipates completing the processing campaign in early May 1997.

The licensee was making preparations to commence excavation activities for source term removal in the North Site area. Some of the preparation includes the relocation of the security fence. The licensee is waiting for approval to commence North Site remediation activities from NRC.

e. Westinghouse

This week Conversion Lines 1, 3, and 4 were being used to process UF_6 gas. Line 2 was shutdown because enough powder had been produced according to Westinghouse's new "Time-Based Management" concept. Line 5, which is normally used to process uranyl nitrate recycle material, has been idle for two weeks. The pellet lines, rod loading, the recovery operation, and IFBA are all operating on a normal schedule with no problems reported.

There have been no process upsets during the past two weeks but the licensee did report one incident which involved an operator's hand being caught in a pulley and gear mechanism inside an enclosure while he was trying to change a light bulb. The person was taken to the Richland Memorial Hospital where his wounds were treated. His hand and forearm were lacerated but no bones were broken. A Radiation Control Technician accompanied the injured operator and was able to collect all the contaminated dressings, etc. and take them back to the site. A survey of the man's hand following treatment indicated that all the contamination had been removed from the wounds and that none remained on the hand. The injured operator has been placed on a daily urinalysis program for the next week to 10 days to determine the extent of uptake of material, if any.

2. U. S. Department of Navy - I-125 Contamination Event

On March 12, 1997, Jay L. Henson, the Navy Master Materials License Program Manager, inspected the Navy Drug Screening Laboratory in Jacksonville, Florida. This reactive inspection was performed to review

the events that lead to the delivery of the leaking package to Brooks Air Force Base. Mr. Henson identified four violations of DOT regulations and one 10 CFR Part 30 requirement regarding transfer of licensed material during the inspection. Region II will review the violations to determine if escalated enforcement is warranted. (See attached PN).

3. Navy Radiation Safety Committee Meeting

B. Mallett and J. Henson will be attending the quarterly Navy Radiation Safety Committee meeting in Crystal City, VA on March 19, 1997.

6. Agreement State Events

No significant issues were identified by the Agreement States during the week except that the Troxler gauge reported last week near Delray Beach, FL was recovered by another contractor working on site. See attached Morning Report.

PRIORITY ATTENTION REQUIRED MORNING REPORT - REGION II MARCH 10, 1997

Licensee/Facility:

General Electric Company
Nuclear Energy Production
Wilmington, North Carolina
Dockets: 00701113 License No: SNM-1097

Notification:

MR Number: 2-97-0015
Date: 03/10/97

Subject: SHIPPING CONTAINERS MARKED EMPTY FOUND TO CONTAIN MATERIAL

Discussion:

On March 6, 1997, the General Electric fuel fabrication facility in Wilmington, NC received a 40 foot long tamper-safed shipping container from Empresa Nacional del Uranio, SA (ENUSA) in Spain. The shipping papers indicated the container held 150 empty BU-J shipping containers. As GE began unloading the shipping container on March 7, they observed that two of the inner BU-J containers were also tamper-safed with seals that appeared to belong to the shipper, ENUSA.

Upon opening the two BU-J containers, GE found two 5-gallon containers in each. In BU-J container M3171, the cans were labeled as containing 16.5 kilograms (kgs) and containing 4.4 kgs. In BU-J container M3200 the cans were labeled as containing 22.1 kgs and containing 19.7 kgs. It is not clear at this point whether the weights refer to the oxide or uranium contents. During a radiation survey, GE found 4000 disintegrations per minute per 100 square centimeters of alpha contamination on the outside of one of the 5-gallon cans, but the outsides of the BU-Js and the 40 foot container were clean. GE found no moisture in the BU-Js and there was no damage to the containers.

On March 7 at 4:15 pm, GE notified the NRC of the above information. GE tamper-safed the 5-gallon cans and placed them in quarantine. Subsequently GE found another BU-J containing material by performing radiation surveys on the containers and notified the NRC at 8:55 pm on March 7. The third BU-J did not have a tamper seal in place but did have a piece of wire through the bolt as if the seal had been broken. At approximately 8 pm on March 7, ENUSA notified GE that a review of their records indicated that a third BU-J had been shipped; this was the container that GE had identified by radiation surveys. The third BU-J was quarantined without opening. Once GE has obtained sufficient information from ENUSA to safely handle the material, they will prepare a Temporary Operating Instruction to cover the work. ENUSA had intended to ship this material at a later date for recovery.

ENUSA is licensed to possess uranium oxide up to 5 percent enrichment. The ENUSA records for this material is that it has enrichments of 3.95 percent and 4.4 percent, and is scrap material to be recovered. ENUSA informed GE that they have notified CSN (the Spanish regulatory agency) and EURATOM.

The Department of Transportation has been notified.

Regional Action:

Region II will review the GE and ENUSA incident reports during the next routine inspection.

REGION II MORNING REPORT
MR Number: 2-97-0015 (cont.)

PAGE 2

MARCH 10, 1997

Contact: G. L. Troup

(404)331-5566

ONE LINERS FOR MARCH 28, 1997

1. Fuel Facilities Status

a. Babcock and Wilcox (B&W) - NNFD

A routine semi-annual MC&A physical inventory is being conducted this week. A routine MC&A inspection is scheduled for next week. The inspection team will consist of two headquarter's MC&A inspectors and a contractor.

Routine production activities are being conducted in the Research and Test Reactor Fuel Element facility.

The Uranium Recovery facility is shut down for inventory. Operations are scheduled to resume Sunday night with a routine Naval Reactor fuel contract.

The Sapphire down blending facility remains shut down due to intrusion of rainwater into a ventilation ductwork. This resulted in 1x LEU used in the down blending process being mixed with naval reactors HEU material in the ductwork. The licensee and NRC are currently evaluating corrective actions including possible ventilation system modifications. By design, the water drains from the ductwork by carrying any accumulated enriched uranium to a safe geometry vessel.

IAEA inspectors were on site March 15 through 18 for a routine monthly audit of Sapphire down blending activities.

The Modified Fuel Process is shut down due to product quality concerns. Limited testing is being conducted to resolve the concerns.

The SRI will not be on site next week. Bassett and Ayres will be at Framatome Cogema Fuels and able to respond to events.

b. B&W Fuel Co. (Framatome Cogema Fuel)

Routine rod loading operations are being performed on two 8 hour shifts. Routine decontamination and refurbishment activities are being conducted in the SERF facilities.

A three member inspection team, consisting of 2 NMSS inspectors and the NNFD SRI was on site March 25 through 27. The team verified corrective actions stated in the licensee's response to violations regarding the inadvertent shipment of a NUKEM fuel assembly. A Confirmatory Action Letter preventing the downloading of more NUKEM fuel assemblies is expected to be rescinded by NMSS next week.

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c. General Electric - Nuclear Energy Production

Robert Nardelli, President, GE Power Systems and Steve Specker, Vice President, GE Nuclear Energy visited the facility this week to review the status of plant operations and tour the Dry Conversion Facility (DCF). An Open House for the DCF is being held on March 28 for plant personnel. Most of the site will be shutdown for the long Easter weekend.

Pre-operation testing of the DCF Line 1 vaporization process began on March 24. Testing of vaporization and conversion is being performed in accordance with the vendor's test procedure. Once this is completed, the Control System software will be set ("frozen") and safety interlocks will be functionally tested. (This should start about April 7).

ADU Lines 1-4 are currently operating, but only Line 3 (HiE) will run over the weekend. Line 5 and 6 are down. Plant throughput for HiE is currently limited by the capacity of the Mill, Slug, Granulation (MSG) step. Despite a lack of HiE rods, bundle assembly is working two shifts. They are completing partial assemblies and storing them until rods are available, so either Line 3 or line 5 can run HiE. A facility change is being made to upgrade the MSG on line 5 to handle HiE. This should be completed next week. Solvent extraction in Uranium Recovery is shutdown until Line 5 can be started.

On March 25, during a test of the horns for the Criticality Warning System in DCF, an amplifier board failed and two loops of horns did not sound. In the event of this type of failure, a failure alarm is supposed to sound in two offices and the circuit is supposed to shift to a back-up board to maintain operability. This did not occur. A contractor service representative replaced the board and the system was successfully tested. A GE representative will take the failed board to the manufacturer's facility next week and observe the investigation as to why it did not function properly. GE has advised the manufacturer that depending on the result of the investigation, it might be reportable under 10 CFR Part 21.

As further followup to the March 7 event where SNM was shipped from ENUSA to GE in containers marked "Empty," news articles in Spain indicated that ENUSA is investigating and taking corrective actions for the incorrect shipment. The incident is also being reviewed by regulatory authorities in Spain.

d. Nuclear Fuel Services, Inc.

The licensee continues to receive about one shipment per week of UF_6 cylinders from the U. S. Enrichment Corporation Gaseous Diffusion Plant in Portsmouth, Ohio. No problems have been encountered during the shipment thus far.

The licensee continues to process the HEU material shipped from the DOE facility in Rocky Flats on schedule. NFS has completed processing approximately 70% of the uranyl nitrate. The licensee has been processing about 225 liters of material per week (40 kg), or about five 11-liter bottles per day. NFS anticipates completing the processing campaign around mid-April.

During the past two weeks the licensee has experienced two incidents that has caused some delays in the HEU material processing. Following a heavy rainstorm, water leaked through the roof and into a control switch box for a nitric acid pump. Operations had to be stopped until the switch box and the roof leak were repaired. Also, an operator error caused an overflow of a vacuum scrubber column in the HEURF. The operator opened a valve and was trying to fill the column with water when he noticed that there was no flow. He went to check on the pump and found that the power to the pump had been secured. After turning the power back on, the operator returned to find that he had left the valve open and the column had overflowed. The operator was reinstructed to turn off the valve before leaving the area to check on any other equipment.

The facility will be shutdown on March 28 for Good Friday; operations will resume on Monday, March 31.

The licensee received a license amendment and the approval to commence North Site remediation activities from NRC. The licensee plans to begin excavation activities for source term removal in the North Site area on April 10. The site was being used to bury radioactive waste several years ago.

e. Westinghouse

The plant is currently in the process of shutting down for the Easter holiday and planned maintenance activity. The electricity will be turned off on Friday for electrical maintenance. Other maintenance work is scheduled for next week and the annual physical inventory will be conducted Tuesday and Wednesday of next week as well. The facility will not resume operations until Monday, April 7. No problems, process upsets, or accidents have been reported during the past two weeks. The site was used to bury radioactive waste several years ago.

2. Independent Spent Fuel Storage Installations

a. Arkansas Nuclear One and Oconee

On 3/26/97, ANO found a weld crack on the confinement boundary of a storage container during helium leak testing. The licensee uses the VSC-24 storage container designed by Sierra Nuclear Corporation. Palisades and Point Beach also use the VSC-24. During the exit at Sierra last Friday, the NRC inspection team

questioned whether the design precluded Lamellar Tearing. This finding is very significant since the containment boundary is involved. There are no containers of this type being used in Region II.

b. Oconee

While performing a "dry run" of its spent fuel loading equipment, using simulated spent fuel, the license discovered that the welds on the rail carrying the device were undersized. These rails are being installed to carry fuel into new storage modules and may have cracked in an actual loading event. Duke is currently evaluating the welding of the sub-contractor who provides these rails. A possible violation is being considered by Region II for Duke's failure to follow its QA procedure.

3. Ch - Nuclear (Barnwell) and Tri-State Trucking

On March 27, 1997, individuals at the Millstone nuclear power plant reported to the NRC Operations center that a container received at the site was missing a valve that was contaminated with radioactive materials. The valve was from a vessel that was being transported by Tri-State Trucking from the Barnwell disposal site in South Carolina to the Millstone site. The truck driver indicated that the valve was on the vessel when he left the Barnwell site and was first noticed as missing at a fuel station in New Jersey.

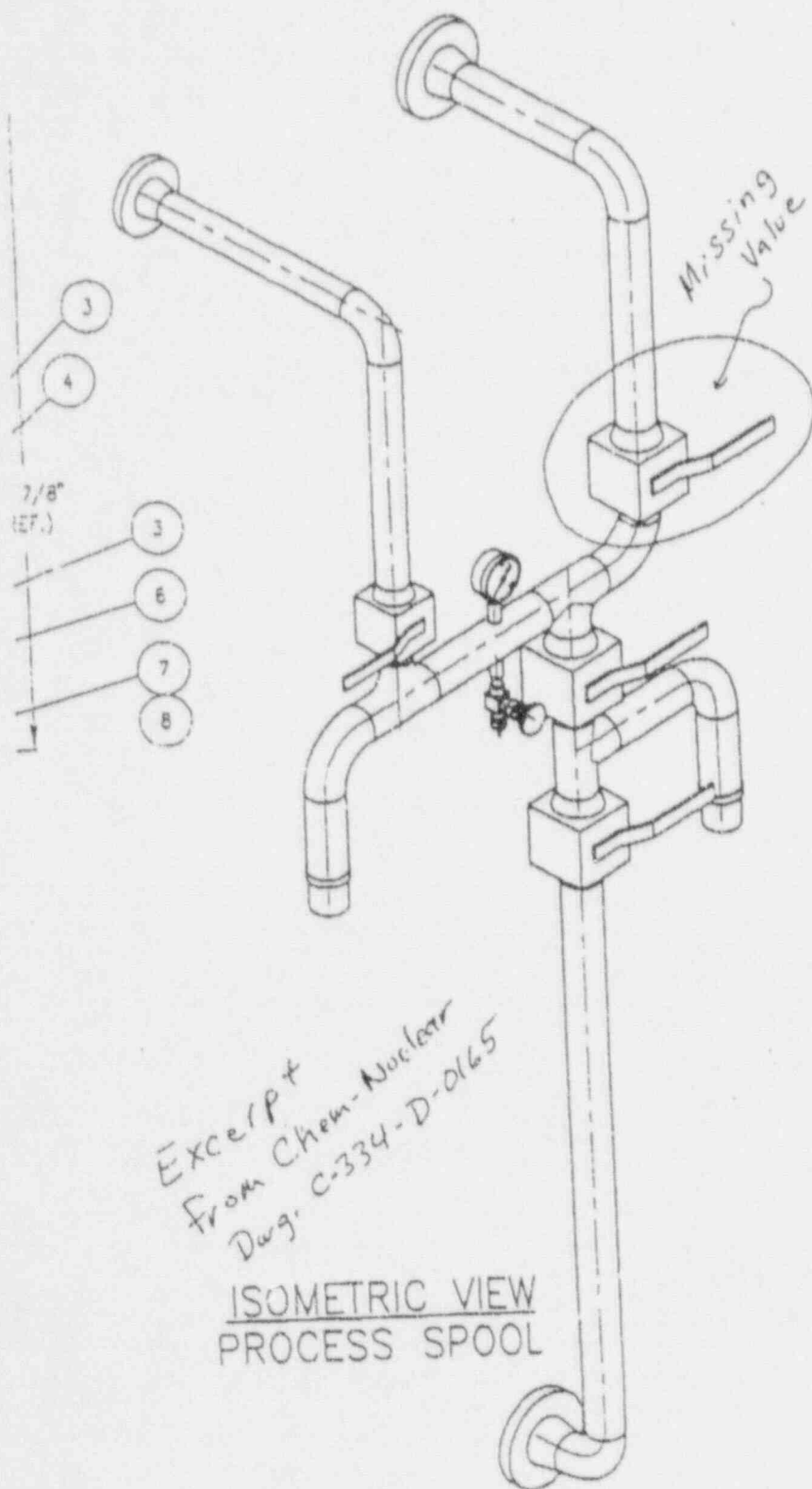
Radiation surveys of the vessel performed in the vicinity of the valve prior to transport indicated a radiation level of 60 mR/hr. Therefore, the missing valve should not emit levels above this value.

Region I notified the States where the truck traveled in that Region and Region II notified the States in Region II. Region I also notified the Department of Transportation. Region II is following up with the Barnwell site and will issue a P/N. Attached is a diagram of the valve and location on the vessel piping.

4. Meeting with Department of Health in San Juan, Puerto Rico

On April 3, B. Mallett, H. Bermudez, and D. Cool, Director, Division of Industrial and Nuclear Material Safety, NMSS, will be meeting with the Secretary of the Puerto Rico Department of Health in San Juan, Puerto Rico. The purpose of the meeting is to establish a plan for followup of patients that received overexposures due to miscalibrations and miscalculations in conjunction with eye therapy using Strontium-90. The total number of overexposure identified to date is 201.

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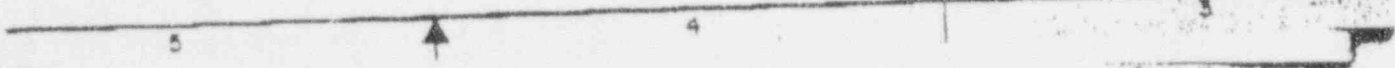
25	1	1 1/2" WELD NECK FLAN
24	1	1 1/2" PIPE, SCH. 40,
23	1	1 1/2" 90° L.R. ELBOW,
22	1	1 1/2" PIPE, SCH. 40,
21	1	1 1/2" BALL VALVE, FULL
20	1	2" REDUCING TEE X 1-1/2"
19	1	2" PIPE, SCH. 40, 14-1/2"
18	1	1/4" HOSE BARB x 1/4"
17	1	1/4" NEEDLE VALVE, 1/4"
16	1	1/4" HEX NIPPLE, S.S.
15	1	GAUGE, PRESSURE, 0-15
14	2	1/4" COUPLING, 150 LB
13	1	2" PIPE, SCH. 40, 34-3/4"
12	2	2" TEE, SCH. 40, B.W.,
11		
10	3	2" WELD NECK FLANGE,
9	1	2" PIPE, SCH. 40, 12"
8	3	2" CAM-TYPE CAP, ALUM
7	3	2" CAM-TYPE CONNECTE
6	3	2" PIPE, SCH. 40, 6" L
5	4	2" BALL VALVE, FULL PO
4	3	2" PIPE, SCH. 40, 6" L
3	6	2" 90° L.R. ELBOW, SCH.
2		
1	1	2" PIPE, SCH. 40, 25" L
ITEM	QTY	

Excerpt
From Chem-Nuclear
Dwg. C-334-D-0165

ISOMETRIC VIEW
PROCESS SPOOL

DIMENSIONS ARE IN INCHES UNLESS NOTED
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HOLE DIA. & LOC. ± 1/32 DEC. X & .1
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April 8, 1997

General Electric Company
ATTN: Mr. C. P. Kipp, General Manager
GE Nuclear Energy Production
P. O. Box 780
Wilmington, NC 28402

SUBJECT: NRC INSPECTION REPORT NO. 70-1113/97-02

Dear Mr. Kipp:

This refers to the inspection conducted on March 3-7 and March 17-21, 1997, at the Wilmington facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the report.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

Within the scope of the inspection, violations or deviations were not identified.

In accordance with 10 CFR 2.790, of the NRC's "Rules of Practice," a copy of this letter will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please contact us.

Sincerely,

ES

Edward J. McAlpine, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

Docket No. 70-1113
License No. SNM-1097

Enclosure: NRC Inspection Report

cc w/encl: (See page 2)

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dupe

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cc w/encl:
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 G. Shear, RIII
 C. Cain, RIV
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Distribution w/o encl:
 License Fee Management Branch

OFFICE	RII DHMS									
SIGNATURE										
NAME	GTroup									
DATE	04 /	/ 97	04 /	/ 97	04 /	/ 97	04 /	/ 97	04 /	/ 97
COPY?	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO

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U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.: 70-1113
License No.: SNM-1097
Report No.: 70-1113/97-02
Licensee: General Electric Company
Facility: Nuclear Energy Production
Location: Wilmington, North Carolina
Dates: March 3-7, 1997
March 17-21, 1997
Inspector: G. L. Troup
Sr. Fuel Facilities Inspector
Approved by: E. J. McAlpine, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

Enclosure

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EXECUTIVE SUMMARY

General Electric Nuclear Energy Production
NRC Inspection Report 70-1113/97-02

This routine, announced inspection was focused on the status of the new Dry Conversion Facility (DCF), including operations, training, completion of construction, training and functional testing of systems. Review of previously identified items and reported occurrences was also conducted. Rack shift inspections were conducted on March 17, 18, 19, and 20. The inspection was focused on the safe operation of the facility.

Within the scope of the inspection, no violations or new inspector follow-up items (IFIs) were identified.

Plant Operations

- The long-term corrective actions for calciners were completed. The corrective actions for No. 6 calciner were also completed.
- The actions to identify and control an improperly identified shipment of radioactive material from a foreign shipper was thorough and timely.
- The actions to identify and quarantine possibly defective valves for UF₆ cylinders was thorough and timely.

Training

- The training program for the operators in the Dry Conversion Facility has been completed and the pre-qualification phase has started.
- Special training on hydrofluoric acid accidents, including emergency personnel and off-site support groups, is a positive action.

Dry Conversion Facility Construction

- Construction of process line 1 and the acid recovery facility is complete. Pre-operational testing has begun.
- The adequacy of criticality warning system and the stationary air samplers has not been demonstrated.

Process Safety Analysis

- The safety analysis was a thorough in-depth evaluation of potential hazards and safeguards against the hazards.

Attachments

Partial List of Persons Contacted
Inspection Procedures Used
List of Items Opened, Closed and Discussed
List of Acronyms

REPORT DETAILS

Summary of Plant Status

This report covers two one week periods.

On March 11, the FMO/FMOX building was evacuated when the Criticality Warning System (CWS) alarmed, although it was a false alarm (Paragraph 1.d).

Construction and testing activities for the Dry Conversion Facility (DCF) were progressing.

The State of North Carolina materials license 065-017-1 was renewed on March 3, 1997. This renewal permits operation of the DCF with natural uranium.

An NRC Material Control and Accountability (MC&A) inspection was conducted on March 3-7, 1997 (report 70-1113/97-201). Additionally, the license reviewer for chemical safety was on site on March 18-19, 1997, as part of the license renewal review for license SNM-1097.

1. Review of Previous Events (88020)

a. Calcliner Tube Failure

(1) Inspection Scope

The inspector reviewed the licensee's corrective actions resulting from the failure of the tube in the Line 3 calciner.

(2) Observations and Findings

The Line 3 calciner tube failure reported to NRC on December 3, 1996, and reviewed in NRC Inspection Report (IR) 70-1113/96-12, prompted the licensee to consider a number of long- and short-term corrective actions to preclude a similar event. These corrective actions were documented by letter to Director, Division of Nuclear Materials Safety, Region II, dated December 11, 1996. Attachment III of the letter lists nine corrective actions, the first five of which were to be completed prior to restarting each calciner which processes wet material.

Implementation of the corrective actions was reviewed and documented in NRC IR 70-1113/97-01. At that time, three of the corrective actions had not been completed. During this inspection, the inspector reviewed the completion of these items and the completion of all items for No. 6 calciner.

Corrective action #6 was to be implemented by explicitly modeling material accumulations within the calciner annulus beyond the 25 kilogram (kgs) hemisphere previously analyzed. The analysis (file no. CR #97.NRC) was completed and

reviewed on March 19, 1997. The results of the analysis show that with the tube $\frac{1}{2}$ -full of optimally moderated UO_2 powder at 5% enrichment and material accumulated in the annulus up to 5.25 inches the entire length of the calciner, k_{eff} remains less than 0.97. The total mass of powder for this configuration is 1,145 kgs. for the system, of which 736 kgs. are in the annulus. The previous actions to monitor the tube rotation and the off-gas should identify upset conditions before this limit is reached.

Corrective action #7 was to revise the purchase specification for replacement tubes to require a final stress relief after welding. During the review in January, 1997, it was not anticipated that any new tubes would be ordered in the near future.

However, the calciner tube is carried in the licensee's spare parts computer inventory. When the replacement tube was drawn from spare parts for installation in No. 3 calciner, the computer system initiated purchase of a new one since the inventory was now depleted. A purchase order was initiated in December, 1996. The price quotation was received from the vendor on January 17, 1997. At the time, licensee representatives recognized that the specification had not been revised before the request for quotation had been sent out. On January 22, 1997, the vendor was advised by telephone that annealing after welding was required; this was confirmed by a FAX the same day. A revised quotation was received from the vendor on February 5, 1997, which stated that the tube would be annealed after welding.

The inspector questioned whether the corrective action had been completed, as stated in the licensee's letter of February 25, 1997, in response to the Notice of Violation in IR 70-1113/96-12. After discussions, it was determined that the purchase was not complete until the quotation was confirmed by a purchase order, and the requirements had been changed in January, so the specification had been changed before the next tube was "ordered." However, licensee representatives acknowledged that the specifications for the tube in Stores File should be revised so that they would be correct if it became necessary to order another tube. On March 5, 1997, drawing 0166D91, "Alloy Defluorinator Tube," was revised (Revision 3) to include "NOTE: General Electric requires annealing after roll tube final welds are completed." The Stores File was revised on March 6, 1997, to include Revision 3 of the drawing and the requirement that "tube must be annealed after completion of welding" was added to the specification.

Corrective action #8 was to revise the change control system to require review of any impacts of material changes in process equipment. On February 11, 1997, a mandatory modification was issued to Practices and Procedures (P/P) 10-10, "Configuration Management Program - Fuel Manufacturing," which requires that the Area Engineer is responsible to "evaluate the impact of materials property changes on identified failure modes and safety basis." This completed Corrective Action #8.

No. 6 calciner was not modified when the others were because it was out of service and only processed dry material (recycled powder). No. 6 calciner was brought up to standard by modifying the control system to automatically close the rotary airlock valve from the feed hopper if the tube rotation switch timed out. The control system was also modified to shut the rotary airlock valve if the necessary air sample data is not entered at the required frequency. Software Service Request (SSR) 13937 was implemented for these control changes and approved by the software engineer on February 13, 1997, and accepted by the system "owner" on February 14, 1997. Functional Test Instructions (FTIs) 3C8DF8 and 3C8DF4 were performed on February 13, 1997, to verify that the system functioned. No. 6 calciner was approved to operate by the Area Engineer, Area Manager and Manager, Nuclear Safety on February 13, 1997. The inspector reviewed the FTI results, the check lists for the modification, the SSR, the revised technical report and operating procedure and had no further questions.

(3) Conclusions

The modification to No. 6 calciner was completed in accordance with the licensee's commitments and internal procedures.

b. Improper Material Shipment

(1) Inspection Scope

The inspector reviewed the circumstances involving the receipt of improperly labeled material from a foreign shipper.

(2) Observations and Findings

On March 7, 1997, while unloading a seavan shipping container which contained 150 Model BU-J shipping containers, licensee employees observed that two of the BU-Js had tampersafe seals attached to the bolting ring. These containers were supposedly empty and did not require tampersafe seals. The employees notified the cognizant

personnel. The BU-J containers were moved to a work area and opened. Both BU-Js were found to have two 5-gallon cans inside which were labeled with the content weight. Surveys indicated that the contents were radioactive. A visual examination of the remaining BU-Js did not identify any more which had tampersafe seals but subsequent radiation surveys identified an additional BU-J which contained radioactive material. This container was moved to the work area and confirmed to have two 5-gallon cans inside containing material.

The licensee notified the shipper, Empresa Nacional del Uranio, SA (ENUSA), a Spanish company, when the two BU-Js were found with the tampersafe seals. ENUSA reviewed their records and confirmed that the two containers contained uranium material. The ENUSA records search also identified the third container. From the ENUSA records, a total of 102.41 kgs. of uranium oxide with a maximum enrichment of 4.4% had been shipped. Following notification of the improper shipment by the licensee, ENUSA notified the Consejo de Seguridad Nuclear, the Ministerio de Industria y Energia and EURATOM of the improper shipment. The licensee notified the NRC, the Department of Transportation and the State of North Carolina.

The licensee installed tampersafe seals on the three BU-Js and placed them in temporary storage. An Unusual Incident Report (UIR) DCP-9701 was generated and corrective actions identified.

At the conclusion of the inspection, the investigation report from ENUSA had not been received.

(3) Conclusions

The actions of the licensee employees to identify an unusual condition was exemplary.

The licensee's actions to quarantine the shipment and to conduct surveys to identify any additional containers was thorough and timely.

c. UF₆ Cylinder Valves

(1) Inspection Scope

The inspector reviewed the licensee's action after being notified of a materials problem with valves which might be installed on UF₆ cylinders at the facility.

(2) Observations and Findings

On March 14, 1997, the U. S. Enrichment Corporation (USEC) gaseous diffusion plant at Paducah, Kentucky notified the NRC Operations Office of a stress corrosion cracking problem with the packing nut on Hunt Valve Co. valves (NRC event number EN 31954). In particular, Hunt Valve Co. valves with the packing nut made of Alloy 636 had experienced cracking of the nut, had failed and, in one case, resulted in the release of UF₆.

On March 21, 1997, NRC Region II notified facilities in the region of the problem and requested that the licensees determine if they had any of the valves in question.

The licensee's initial action was to check all valves in the spare parts inventory (55) and the cylinders on the loading dock (about 30). All Hunt Valve Co. valves had nuts of Alloy 613 although some valves manufactured by Superior or Descote had Alloy 636 nuts.

The licensee contacted both USEC Paducah and Hunt Valve Co. and determined that the problem appeared to be limited to Hunt valves. Also, Hunt Valve Co. stated that they had switched to Alloy 613 nuts in about 1991.

During the week of March 17, the licensee inspected the valves on all UF₆ cylinders on site (approximately 275) and found nine Hunt valves with nuts of Alloy 636. Eight were empty and will be returned to the owner for replacement of the valves. One full cylinder was subsequently placed in the cold trap and the valve replaced before it was sent to a vaporizer for processing.

USEC Paducah stated that they would not fill any cylinders with Hunt valves with Alloy 636 nuts. However, Hunt Valve Co. estimates that there could be up to 5,000 valves in circulation with Alloy 636 nuts. The licensee issued a Temporary Operating Instruction (TOI) to inspect all incoming cylinders for the Hunt valves with Alloy 636 nuts because UF₆ cylinders come from sources other than USEC Paducah. The TOI will be evaluated after several months to determine if continued action is necessary.

(3) Conclusions

The licensee took thorough and effective actions to identify the scope of the problem and to take corrective actions to preclude the processing of cylinders with suspect valves.

d. Criticality Warning System

(1) Inspection Scope

The inspector reviewed the cause and corrective actions taken after a false signal from the criticality warning system (CWS) in the Dry Conversion Facility (DCF) caused the evacuation of the fuel manufacturing facility on March 11.

(2) Observations and Findings

On March 11, 1997, a technician was trouble-shooting a problem with the Data Acquisition Module (DAM) on the CWS in DCF. He placed the control switch in "maintenance" to turn off the power, then pulled the suspect Input/Output (I/O) board. Placing the switch in "maintenance" should have deactivated the DAM and given a signal in the Radiation Protection office and in the Emergency Control Center (ECC).

However, when the I/O board was pulled, the CWS for the Fuel Manufacturing Operation activated and sounded the plant evacuation alarm. All fuel operations were properly evacuated and the ECC was manned until the problem could be evaluated. Radiation surveys and review of the CWS detector read-outs revealed that the alarm was false and no criticality had occurred.

The licensee's investigation and discussions with the vendor determined that the DAMs which had been provided included a redundant fail safe relay in the circuit. The licensee had requested that the vendor install the switch with "maintenance" mode. However, the switch did not override the relay. The sub-contractor who ordered the DAMs apparently was not aware of the effect of the relay. With the switch in "maintenance", detectors could be replaced but any maintenance on the DAM required that the system be shut down because of the relay. However, the licensee expected that the DAMs would activate on a true signal or upon a failure.

After discussions with the vendor, vendor representatives were on site on March 18, 1997, and removed the relay circuit from the DAMs. Now, the licensee can work on the boards using the "maintenance" mode on the switch.

(3) Conclusions

No defect was present in the equipment received.

The licensee's investigation as to the cause of the alarm was thorough and adequately resolved the problem.

2. Training (88010)

a. Operator Training

(1) Inspection Scope

The inspector reviewed the training and qualification program to qualify supervisors, operators and technical support personnel for the Dry Conversion Facility (DCF).

(2) Observations and Findings:

The DCF represents a new process technology. Selected members of the staff were sent to the supplier's facility in France for initial training.

Operators and maintenance personnel assigned to the operating shifts attended a training program consisting of approximately 450 hours of classroom instruction. This formal training was completed on March 14, 1997. This training consisted of four general groups: lay-out, controls, general and supplemental. Lay-out training was concerned with the facility and system arrangement. Controls training concerned the various controls associated with the operations and how the process operates. General training was training on a variety of topics including the metric system, instrumentation, the Integrated Safety Analysis, Piping and Instrumentation Diagrams (P&IDs) as well as a variety of subjects such as material control and accountability, radiation safety, nuclear criticality safety, and industrial safety. Supplemental training was additional training on specific topics, including additional training on chemical safety.

Each of the sessions was followed with a learning evaluation. The evaluation was similar to a written examination which was used to assess the learner's understanding of the subject material. The evaluations were used to determine subject areas which required additional individual instruction.

Once the classroom training was completed and shift coverage began, the operators started work on the completion of qualification cards for eleven different stages. Because no uranium or utility service were in use during part of this stage, qualification was only "simulated" at this stage. When the classroom and simulated qualifications (in addition to additional supplemental training) were completed, the pre-qualification summary is signed by the Operations

Resource (OR) and the Area Manager. (The OR acts as a coordinator for the shift team and performs many of the functions associated with the Area Coordinators (ACs) in other plant areas.)

Specialized training was also provided for instrument technicians (8 weeks) and maintenance personnel (2 weeks).

(3) Conclusions

The training program was a major effort which addressed the various safety and operations topics.

Completion of the training and pre-qualification program appears to provide the basic knowledge for the safe operation of facility.

b. Specialized Training

(1) Inspection Scope

The inspector reviewed the special training conducted in association with the start-up and operation of the DCF.

(2) Observations and Findings

The DCF uses hydrogen gas and nitrogen gas and produces hydrogen fluoride, which is converted to concentrated hydrofluoric acid (HF). Specialized training was conducted for the safety of these materials.

The licensee contracted with outside experts to conduct specialized chemical safety training. On March 3, specialized training was conducted on safety for hydrogen gas and nitrogen gas. This training was also given to members of the Emergency Response Team (ERT) and the Emergency Medical Team (EMT). On March 4, training, including practical exercises, was provided to the operators, EMT, ERT and other selected site personnel on HF. In addition, members of the regional North Carolina Hazardous Materials (HazMat) team attended the training.

Specialized training on treating injuries associated with HF will be conducted for the local hospital personnel. This training is scheduled for early April.

(3) Conclusions

Specialized training in new chemicals associated with the DCF is a strong action by the licensee.

The inclusion of emergency response (EMT, ERT) personnel and off-site personnel (state and hospital personnel) is a positive action by the licensee.

3. Dry Conversion Facility Construction (88020)

a. Roof Construction

(1) Inspection Scope

The inspector reviewed the status of the completion of the roof membrane and the installation of the leak detection system.

(2) Observations and Findings

The facility is designed as a "moderation exclusion" area where no moderating materials will be permitted, except under specifically designated conditions, in those areas where UO_2 powder is produced or handled. A principal feature of the "moderation exclusion" principle is the construction of a roof which precludes any leaks of rain into the facility. Details of the roof construction are described in JCC drawings in the A21-ARXX series of drawings and the roofing material supplier project description. The DCF roof is designed to provide multiple barriers to any leakage or seepage of external moisture into the DCF. Details of the roof design and construction are discussed in IR 70-1113/96-02, Paragraph 4.

The inspector observed the installation of the roof edge seal and trim. The installation of the seal and trim appeared to be in accordance with the project drawings and detailed sketches provided by the contractor.

As part of the roof construction, a leak detection system is installed to indicate leakage through the first membrane and the upper slab. The inspector observed that the drain pipes have been installed in three locations on the drain trough. However, the drain collection columns have not yet been installed.

(3) Conclusions

The roof upper membrane and edge trim were installed in accordance with the project drawings.

b. Process System Installation

(1) Inspection Scope

The inspector reviewed the installation of the process systems in the DCF to determine that the systems were in accordance with the process drawings.

(2) Observations and Findings

The inspector selected components and instruments which had been identified by the licensee as having a safety function. This identification was based on the Active Engineered Controls (AEC) draft list or the hazards analysis evaluation.

The inspector then took the P&IDs for the various systems (vaporization, conversion, acid recovery, etc.) and walked down the systems for process line 1 to verify that the equipment was installed and was shown on the P&ID. The inspector also traced out flow pathways to confirm that the process lines were as shown.

All of the valves, instruments and major components were installed as shown. The inspector also verified that switches or contacts which are used to align moveable equipment and permit valves to open when the equipment is in proper alignment (limit switches) were installed as shown.

In the Hydrofluoric Acid Facility, the inspector walked down the common system for process lines 1 and 2. The inspector observed that a system modification had been made which incorporated an additional in-line uranium monitor to the common process header. This provides two independent measurements of uranium concentration before the recovered acid is released to non-favorable geometry tanks as the acid recovery line from each process line also has an in-line monitor.

In reviewing the systems for the powder cooling hoppers, the inspector observed that each hopper has a pressure relief valve to prevent overpressurization of the hopper. However, there is a manually operated valve located downstream of the relief valve where the discharge line connects into a vent header. The inspector questioned this installation because with the manual valve in the "closed" position, the relief valve would not function properly. Licensee representatives stated that all of the lines connecting to the vent header had isolation valves so the vents could be closed when a powder collection container had to be removed. However, they agreed that the relief valve discharge should not be blocked and stated that the subject valves would be locked

open until they could be removed.

(3) Conclusions

The identified AECs and related instrumentation were installed as shown on the P&IDs.

The installation of a second in-line monitor for recovered acid provides additional assurance that nuclear safety limits for the tanks are maintained.

c. Criticality Warning System

(1) Inspection Scope

The inspector reviewed the adequacy of the installation of criticality detectors and the status of system completion.

(2) Observations and Findings

During walkdown of the process systems, the inspector also observed the location of the criticality warning system detectors to assess if they provided adequate coverage. The inspector reviewed the figures in Nuclear Safety Instruction 0.4.0 and compared the actual installation locations. Two detectors were found to have been installed in different locations than shown in the figures although they were within approximately ten feet of the location shown. Licensee representatives stated that the figures would be revised to show the actual location during the current revision.

The process systems and major components are located in individual rooms. However, all but three of the detectors are located in open areas outside the equipment rooms. The structural walls will provide attenuation of radiation. The inspector asked for the documentation that demonstrates that the detectors are capable of meeting the requirements of 10 CFR 70.24 for criticality warning systems. Licensee representatives stated that the analysis to demonstrate the adequacy of the location of the detectors had not been completed but would be performed.

(3) Conclusions

The adequacy of the criticality warning system has not been demonstrated.

d. Air Sampling System

(1) Inspection Scope

The inspector reviewed the basis for the installation of the air sampling system.

(2) Observations and Findings

Stationary air samplers (SAS) are installed in various locations to monitor airborne concentrations and to assess exposures of workers. The samplers have been installed throughout the DCF.

The inspector discussed how the locations were determined and how it was determined that values derived from the samplers would be representative of the actual exposures of the workers. Licensee representatives stated that the current locations for the SASs was based on observations of the equipment and the areas where workers would be relative to potential sources of airborne material. These were not necessarily the final locations as tests will be made of air flow patterns once the final balancing of the ventilation is complete. Checks will also be made as equipment, such as the vaporizers, are heated up. SASs will be relocated based on smoke tests. Until the representativeness of the SAS values is determined, workers will also wear portable air samplers to assess their actual exposures.

(3) Conclusions

The stationary air sampling system has not yet been demonstrated to provide representative sampling data.

4. Functional Testing (88025)a. Test Administration and Control

(1) Inspection Scope

The inspector reviewed the administrative controls for preparing and conducting functional tests of AECs.

(2) Observations and Findings

The primary document is Practices and Procedure (P/P) 10-12, "Functional Test Instructions", which defines the requirements for the procedure and the test program. Section Administrative Routine (SAR) 350-28 "Functional Test Administration" had been issued by the manager of the Chemical Product Line to implement the functional test program. On March 5, 1997, revision 5 to the SAR was issued

which makes it applicable to the Dry Conversion Product Line as well. Functional testing for the DCF will be performed in accordance with the SAR.

(3) Conclusions

Adequate administrative controls are in place to implement the functional test program.

b. Functional Test Instructions

(1) Inspection Scope

The inspector reviewed the status of the functional test instructions (FTIs) to perform tests of AECs and other safety interlocks.

(2) Observations and Findings

During the inspection period, no FTIs for vaporization, conversion or HF recovery had been approved or conducted. The AEC List was being revised and up-dated. The FTIs will change based on the AEC list. Also, the program code for the process control system was being revised to implement controls over accessing and modifying the set points or actions controlled by the process control system.

Tests had been conducted on portions of the system controlled by programmable controllers. However, some controllers were being changed and the code was also being revised based on the initial test results. These tests will have to be conducted again.

Properational tests of the system using the vendor's procedure no. U01.1320, "Manual for No-Load Tests" were scheduled to begin for the vaporization portion of the system but this is dependent on completion of the revision of the program code for the process control system.

(3) Conclusions

Functional testing of the safety interlocks and controls is lagging due to changes in the process control system code and changes in the scope of the AEC list.

5. Process Safety Analysis (88020)a. Analysis Program

(1) Inspection Scope

The inspector reviewed the administrative program for conducting the safety analysis, documenting the findings and resolving the findings.

(2) Observations and Findings

In the renewal application for license SNM-1097, dated April 5, 1996, the licensee committed to conducting an Integrated Safety Analysis (ISA) for the Dry Conversion Process as well as other plant areas once a baseline is established. A P/P has been written to implement the ISA once the license is renewed.

The licensee conducted a Process Safety Analysis for the DCF systems and areas primarily using the Hazard and Operability Analysis (HazOp) methods. This was in accordance with P/P 80-62, "Hazard and Operability Analysis." Other techniques were used in conjunction with the HazOp.

The analyses were performed by teams with a wide range of expertise in safety and operations. For example, the analysis which was performed during March 11-13 for the transition work in FMO and the installation of the Dry Recycle Facility consisted of eleven people. The evaluations of potential hazards and the identification of controls was very detailed and thorough. Evaluated hazards were then ranked according to the likelihood of occurrence and the severity of the consequence.

A summary of the DCF ISA was submitted to the NRC on February 19, 1997, in support of the license renewal.

(3) Conclusions

The safety analysis was conducted by qualified personnel using generally accepted evaluation methods.

The safety analysis was a very thorough in-depth evaluation of the facility systems and potential operator actions.

b. Safety Analysis Implementation

(1) Inspection Scope

The inspector reviewed how the safety analysis findings were translated into safety controls.

(2) Observations and Findings

In the Safety Analysis worksheets, various items were identified as "safeguards" or actions which would occur when instrumentation sensed an upset condition to preclude the identified consequence.

The inspector selected approximately fifteen of these safeguards from the safety analyses for vaporization, conversion and HF recovery and compared them to the draft AEC list. All of the identified safeguards were listed on the draft AEC list and identified with FTIs to verify that the safeguard responded properly.

Verification that the safeguards function properly will be reviewed as part of pre-operational testing. Those actions which require operator actions will be reviewed in conjunction with the operating procedure review.

(3) Conclusions

The safeguards appeared to be addressed in the test program. However, the AEC list and FTIs are still in draft.

6. Exit Interview Summary (88020)

On March 21, 1997, the inspection scope and findings were summarized with licensee representatives. The inspector discussed in detail the areas inspected, the findings and concerns which had been identified. There were no dissenting comments expressed by licensee representatives.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

- *M. Chilton, Manager, Joint Conversion Project
- *T. Flaherty, Manager, DCP Operation
- *R. Foleck, Sr. Licensing Specialist
- C. Kipp, General Manager, GE-NEP
- *J. Kline, Manager, Powder Product Line
- A. Mabry, Program Manager, Radiological Safety
- *R. Martyn, Manager, Material Control and Accountability
- C. Monetta, Manager, GE-NE Environment, Health & Safety
- *S. Murray, Team Leader, UO₂ Production Team
- *L. Paulson, Manager, Nuclear Safety
- *L. Quintana, Manager, Fabrication Product Line
- *R. Reda, Manager, Fuels and Facility Licensing
- *G. Smith, Team Leader, FMO Maintenance Support
- *D. Snell, Manager, Service Components Product Line (Acting GM - GE-NEP on March 21, 1997)
- C. Tarrer, Team Leader, Configuration Management & ISA
- C. Vaughan, Project Manager, EH&S- New Facility Licensing/Safety

*Attended exit meeting on March 21, 1997.

INSPECTION PROCEDURES USED

IP 88010	Operator Training/ Retraining
IP 88020	Operations Review
IP 88025	Maintenance/ Surveillance Testing

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS

AC	Area Coordinator
AEC	Active Engineered Control
CFR	Code of Federal Regulations
ChPL	Chemical Product Line
CR	Change Request
CSA	Criticality Safety Analysis
CWS	Criticality Warning System
DCF	Dry Conversion Facility
DCP	Dry Conversion Project
ECC	Emergency Control Center
EH&S	Environment, Health & Safety
EMT	Emergency Medical Team
EN	Event Number
ENUSA	Empresa Nacional del Uranio, SA
ERT	Emergency Response Team
FMO	Fuel Manufacturing Operation
FTI	Functional Test Instruction
GE-NE	General Electric- Nuclear Energy
GE-NEP	General Electric- Nuclear Energy Production
HazMat	Hazardous Materials
HF	Hydrogen Fluoride or Hydrofluoric Acid
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IR	Inspection Report
ISA	Integrated Safety Analysis
JCC	Joint Conversion Company
KGS	Kilograms
MC&A	Material Control & Accountability
NCS	Nuclear Criticality Safety
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSI	Nuclear Safety Instruction
NSR/R	Nuclear Safety Requirements/Release
ONMSS	Office of Nuclear Materials Safety and Safeguards
OP	Operating Procedure
OR	Operations Resource
PA	Public Address
P/P	Practices & Procedures
P&ID	Piping and Instrumentation Diagram
RP	Radiation Protection
SAR	Section Administrative Routine
SAS	Stationary Air Sampler
SNM	Special Nuclear Material
SSR	Software Service Request
TOI	Temporary Operating Instruction
UF ₆	Uranium Hexafluoride
UIR	Unusual Incident Report
UO ₂	Uranium Dioxide
USEC	U. S. Enrichment Corporation

April 18, 1997

General Electric Company
ATTN: Mr. C. P. Kipp, General Manager
GE Nuclear Energy Production
P. O. Box 780
Wilmington, NC 28402

SUBJECT: NRC INSPECTION REPORT NO. 70-1113/97-03

Dear Mr. Kipp:

This refers to the inspection conducted on March 24-27, 1997, at the Wilmington facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the report.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

Within the scope of the inspection, violations or deviations were not identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please contact us.

Sincerely,

ES

Edward J. McAlpine, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

Docket No. 70-1113
License No. SNM-1097

Enclosure: NRC Inspection Report

cc w/encl: (See page 2)

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cc w/encl:
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
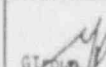
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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1113

License No.: SNM-1097

Report No.: 70-1113/97-03

Licensee: General Electric Company
Wilmington, NC 28402

Facility Name: Nuclear Energy Production

Dates: March 23-27, 1997

Inspector: W. Gloersen, Senior Radiation Specialist

Approved by: E. J. McAlpine, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

Enclosure

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Executive Summary

General Electric Nuclear Energy Production NRC Inspection Report 70-1113/97-03

The primary focus of this routine unannounced inspection was the observation and evaluation of the licensee's environmental protection and waste management programs. In addition, the status of the new Dry Conversion Facility (DCF) was reviewed with respect to radiation protection, radioactive effluent waste management and functional testing of sampling systems. The report covered a one week period and included the results of inspection efforts of one regional fuel facility inspector.

Based upon the results of this inspection, the licensee's environmental protection and waste management programs were acceptable. Within the scope of the inspection, one non-cited violation was identified for the failure to collect and analyze a vegetation sample as required by the license application. There was one new inspector follow-up item being tracked pertaining to reviewing the licensee's internal dose assessment of the CaF₂ basin excavation equipment operators.

RADIATION PROTECTION

- Installation and functional testing of the stationary air sampling equipment associated with the Dry Conversion Facility had not been completed and therefore the licensee could not demonstrate air sampling representativeness.
- Radiation protection posting and access control requirements had not been completed for the Dry Conversion Facility.
- A high volume air sample indicated elevated gross alpha airborne concentrations in the vicinity CaF₂ excavation of the south basin.

ENVIRONMENTAL PROTECTION

- Analytical results from the various surface environmental samples collected indicated that there was no radioactive material from plant operations accumulating or concentrating at the sample location.
- One isolated example for the failure to collect a vegetation sample during the second half of 1996 was identified.
- Elevated concentrations of uranium in certain samples from groundwater wells in the vicinity of the CaF₂ pits was identified.
- The 1996 external audit of the environmental protection function was thorough, however, the audit was lacking in that it provided no assessment of performance for the licensee.

WASTE MANAGEMENT

- The licensee had effectively implemented the required stack sampling program.
- Total quantities of radioactive liquid and gaseous emissions from the facility have been decreasing since 1994.
- Equipment installation, functional testing, and procedure development for the collection and analysis of gaseous and liquid samples associated with the Dry Conversion Facility were not ready to support operation of the facility.

Attachments:

Partial List of Persons Contacted

Inspection Procedures Used

List of Items Opened, Closed, and Discussed

List of Acronyms

Report Details

I. Introduction

A. Inspection Overview

1. Purpose

This inspection was conducted to determine the adequacy of the licensee's environmental protection and waste management programs. This routine inspection was conducted through a review of selected records, interviews with personnel, and direct observation of work activities in the areas of facility operations, environmental protection, and waste management.

2. Major Areas of Emphasis

Areas inspected included:

- Environmental Protection Program Implementation
- Effluent Waste Management Program
- DCF Operational Readiness in the areas of Radiological Protection and Radiological Effluent Controls

B. Summary of Plant Status

This report covered a one week period. There were no unusual plant operational occurrences during the onsite inspection. Construction and testing activities for the DCF were progressing.

II. Radiological Controls

A. Radiation Protection (83822)

1. Radiation Protection Program Equipment

a. Inspection Scope

The inspector examined the stationary air sampling system and other radiation protection equipment necessary to support operations in the new DCF.

b. Observations and Findings

During tours of the DCF, the inspector noted that most of the stationary air samplers (SAS) had been installed, however, it was also noted that several air sampling heads were missing; the system had not been functionally tested; and the final locations

for air samplers had not been determined (see Inspection Report No. 70-1113/97-02). The licensee indicated that at DCF startup, 25%-50% of the workers will be issued lapel air samplers to evaluate personnel exposures.

The inspector also noted that the licensee had established a DCF radiation protection action item checklist, which required that the action items be closed before DCF startup. The completion of the installation, testing, and procedures for the SAS was included on the action item list. In addition, the action item list included the establishment of a radiation protection work area in the DCF with necessary counting equipment and instrumentation; adequate respiratory protection equipment and supplies of protective clothing; and adequate supplies of high volume, low volume, and lapel air samplers.

c. Conclusions

Installation and functional testing of the stationary air sampler (SAS) equipment had not been completed and therefore the licensee could not demonstrate air sampling representativeness. The licensee's radiation protection action item list to support DCF operations was acceptable.

2. Internal Exposure Controls

a. Inspection Scope

The inspector examined work activities associated with the CaF₂ Basin source removal and relocation project to determine if adequate radiation protection controls were in place.

b. Observations and Findings

During a tour of the CaF₂ Basin source removal and relocation project on March 25, 1997, the inspector observed excavation activities of the south basin (Basin #1). The excavation activities involved the removal of the CaF₂ using heavy machinery. During dry conditions, the potential for dusty conditions existed. The inspector noted that the heavy equipment operator was not wearing a lapel air sampler, nor was a lapel air sampler required by the procedure. CaF₂ Project Health and Safety Plan, Revision 1, March 11, 1997, indicated that personnel radiation exposure is monitored by (1) thermoluminescent dosimeters (TLDs); (2) in-vitro bioassays; and (3) area radiation monitoring. After the observation by the inspector, the licensee requested that a high volume air sample be collected. The high volume air sample result was 0.96E-11 μ Ci/ml. The inspector discussed the result with licensee representatives who indicated that the excavators will be

issued lapel air samplers so that any potential internal exposure could be evaluated. The inspector indicated that the results of the internal exposure assessment will be tracked as an inspector followup item (IFI 70-1113/97-03-01).

c. Conclusions

By collecting a high volume air sample, the licensee detected elevated gross alpha airborne concentrations in the vicinity CaF₂ excavation of the south basin. No conclusions can be made until more data are collected and assessed.

3. Postings, Labeling, Access Control

a. Inspection Scope

The inspector examined DCF to determine if adequate postings and access control measures were in place to support operations in the new Dry Conversion Facility.

b. Observations and Findings

During tours of the DCF, the inspector noted that the facility was in the final construction stages and therefore the necessary radiation protection postings and radiation control area access had not been established. As noted above, the licensee had established a DCF radiation protection action item checklist. DCF posting and access control requirements were included on the action item checklist.

c. Conclusions

Although the necessary radiation protection posting and access control requirements had not been completed, the licensee's system for tracking these items for completion before DCF startup was acceptable.

B. Environmental Protection (88045)

1. Monitoring Program Results

a. Inspection Scope

The inspector reviewed the licensee's environmental protection program with respect to program implementation. Table 5.1 of Chapter 5 of the License Application specifies sampling frequency, parameters analyzed, action levels, minimum detectable concentrations (MDCs), and sampling types collected. Figures 5.3, 5.4, 5.5, 5.6, and 5.7 of the same chapter contained maps showing the locations of sampling sites throughout the area.

b. Observations and Findings

The environmental monitoring program provided representative measurements of radioactivity in the highest potential exposure pathways and verification of the accuracy of the effluent monitoring program of environmental exposure pathways. Accumulation of radioactivity in the environment can thereby be measured; trends assessed, to determine whether the radioactivity resulted from plant operations; projections made of potential dose to off-site populations based on the cumulative measurements of any plant-originated radioactivity; and detection of unanticipated pathways for the transport of radionuclides through the environment. The program was designed to detect the effects, if any, of plant operation on environmental radiation levels by monitoring radiation pathways in the area surrounding the plant site. It also verified that the measurable concentrations of radioactive materials and levels of radiation were not higher than expected on the basis of the effluent measurements.

The inspector reviewed selected sampling results from weekly environmental stationary air samples; and surface water, sediment, and soil samples collected quarterly in 1996 as part of the licensee's routine environmental monitoring program. Most of the sampling locations around the facility were below the appropriate action level specified in Table 5.1 of the Application. The inspector did note that, in the first, second and fourth quarters 1996, a few onsite and offsite soil sample locations had slightly elevated total uranium concentrations that exceeded the licensee's action level of 0.7 ppm as specified in Table 5.1. In those cases, the licensee issued an Environmental Action Level (EAL) investigation. The inspector reviewed selected EAL investigations that documented elevated soil sample results that occurred in 1996. The EAL investigations were adequately documented and part of the licensee's followup action was to watch the trend. The inspector indicated that additional appropriate actions might include a review of sampling procedures and techniques and a review of the analytical procedures used in the CHEMET laboratory where the environmental samples were analyzed. The licensee acknowledged the inspector's comments.

During the review process, the inspector noted that the results for the vegetation samples scheduled for collection in Fall 1996 were not available. Table 5.1 of the license application requires the licensee to collect vegetation samples twice per year and to be analyzed for fluorides. By the end of the onsite inspection, the licensee was still in the process of locating the sample results. In a subsequent telephone call on April 7, 1997, the licensee informed the inspector that the vegetation sample was not collected in the Fall 1996. Apparently, the sample was inadvertently missed and it was not included on the licensee's overcheck list. In addition, Table 5.1 did not specify an action level for vegetation samples. The corrective actions included the

issuance of an Action Level Investigation Form, collection of a vegetation sample and the analysis (in addition to the first half 1997 sample), and update the overcheck list to include vegetation sampling. The licensee was informed on April 15, 1997 that the failure to collect the vegetation sample was a violation of Safety Condition S-1, Sections 5.2.2.3 and Table 5.1 of the Application. However, this violation will not be subject to enforcement action because the violation was of minor environmental concern, the licensee's efforts in correcting the violation were prompt, and the violation met the criteria specified in Section IV of the NRC Enforcement Policy for a Non-Cited Violation (NCV 70-1113/97-03-02).

The inspector also reviewed the results of the licensee's groundwater monitoring program. Table 5.1 of the license application specified the sampling locations, collection frequencies, analytical parameters, and action levels. In 1996, most of the groundwater monitoring results were below the license application action level. However, the inspector noted that groundwater sample results for total uranium from the wells installed downgradient from the CaF₂ pit relocation project ranged from approximately 2 to 3181 pCi/liter. The maximum concentrations occurred during the excavation activities. The licensee met with representatives of the State of North Carolina's Department of Environment, Health and Natural Resources (DHENR) on December 19, 1996 to discuss the results of the CaF₂ well monitoring data. The State DHENR representatives noted that since the groundwater sample results were in excess of State groundwater quality standards, the licensee was required to fully assess the vertical and horizontal extent of the affected groundwater and propose a corrective action to restore the groundwater. In a letter dated March 3, 1997 from the licensee to the State of North Carolina, the licensee transmitted a schedule for actions to address the issues raised by the DHENR. The inspector indicated that further review of the licensee's progress in addressing the groundwater issues will be made during subsequent inspections.

The inspector also noted that groundwater sample results from Well PL-11A, which was installed east of the NE CaF₂ basin and became operational on January 30, 1995, ranged from 40 to 21,600 pCi/liter during the period January 30, 1995 to February 17, 1997. The sample result collected on February 17, 1997 was approximately 920 pCi/liter. The licensee believed that this well may have been drilled into a vein of CaF₂ sludge. The licensee installed two additional wells downgradient from PL-11A. To date, the sample results from those wells indicated background levels.

c. Conclusions

In general, the analytical results from the various surface environmental samples collected indicated that there was no

concentrating at the sample location. There was one isolated example for the failure to collect a vegetation sample during the second half of 1996. The licensee had detected elevated concentrations of total uranium in certain groundwater wells in the vicinity of the CaF₂ pits. The elevated activity was most likely due to the excavation of the CaF₂ during the source term relocation project in 1996.

2. Management Audits, Inspections, and Controls

a. Inspection Scope

The inspector reviewed the licensee's environmental protection audit program and results. The requirements of the environmental protection internal audits were specified in Section 2.8.2 of the license application. The requirements for external audits were specified in Section 2.8.3 of the application.

b. Observations and Findings

The inspector randomly examined records of both internal and external environmental protection audits. The last external audit was conducted the week of September 23-27, 1996 by the licensee's cross business unit. The audit covered management and organization, operating permits, air emissions, waste water, waste management, radiation protection, soil and groundwater contamination, and procedures. The audit was comprehensive, however, a heavy emphasis was placed on OSHA and EPA regulatory compliance. The audit findings were formally tracked, including the corrective actions and issue date; assigned to a person or organization for closure action; identified an action completion date; and identified the closure status. The inspector did note, however, that the external audit provided no assessment of licensee performance in the environmental protection area.

The inspector also reviewed the quarterly internal audits conducted in 1996. Each of these audits focused on a particular aspect of the Health and Safety program, including, the environmental protection function, training, waste storage, and radiological protection. The last quarterly environmental audit was conducted during the first quarter 1996. There were no audit findings identified. The inspector noted that for the other quarterly audits conducted in 1996, there was no apparent formalized tracking system for audit findings.

c. Conclusions

The 1996 external audit of the environmental protection function was thorough, the audit findings were tracked, and the assignment of responsibility for closure was acceptable. However, the audit

was lacking in that it provided no assessment of performance for the licensee. In addition, a more formalized system to track internal audit findings was noted as an area for improvement.

3. Decommissioning Activities- CaF₂ Relocation Project

a. Inspection Scope

The inspector reviewed the licensee's progress in evaluating the residual radioactivity remaining in the burial trenches of the northwest CaF₂ storage area after relocation of the material to an above ground storage facility in the Controlled Access Area (CAA). In addition, the inspector reviewed the progress in removing the CaF₂ from three basin areas.

b. Observations and Findings

As of the end of July 1996, the licensee had essentially completed the excavation and relocation of the CaF₂ from the northwest storage area. The licensee was in the process of implementing the Final Status Survey and Release Plan for the Northwest CaF₂ Area (FSS Plan) in order to demonstrate that residual radioactivity concentrations at the northwest CaF₂ storage area satisfied the NRC criteria for future use without licensing restrictions and radiological controls. The inspector indicated to the licensee that a representative number of samples should be split, preserved, and stored for possible future NRC analysis for confirmatory measurement purposes.

The inspector also noted that the licensee had initiated the CaF₂ removal from the South Basin (or Basin # 1) and relocation to an above ground storage facility. The licensee estimated that 29,970 cubic feet (ft³) of CaF₂ was in the basin. In addition, the licensee had planned to remove CaF₂ in both the North Basin (Basin #2- 37,690 ft³) and the Outer Basin (Basin #3- 34,280 ft³). Although the licensee's goal was to remove the CaF₂ source term, the licensee had not planned to release these areas without licensing restrictions and radiological controls due to their proximity to the operating site process lagoon system. The licensee's request to delay "free release" of the CaF₂ basin area was still being reviewed by the NRC.

c. Conclusions

The licensee had completed excavation of the CaF₂ in the Northwest Storage Area well within the schedule and was progressing acceptably toward implementation of the Final Status Survey and Release Plan.

C. Waste Management (88035)

1. Monitoring Program Results

a. Inspection Scope

The inspector reviewed and assessed records and reports of gaseous and liquid effluent discharges from the facility during the last calendar year and compared those discharges to discharges from previous years.

10 CFR 70.59 requires the licensee to submit a report to the NRC Region II office, within 60 days after January 1 and July 1 of each year, specifying the quantity of each of the principal radionuclides released to unrestricted areas in liquid and gaseous effluents during the previous six months of operation. If the quantities of radioactive materials released during the reporting periods are significantly above the licensee's design objectives previously reviewed as part of the licensing process, the report shall cover this specifically.

b. Observations and Findings

The inspector reviewed the Semiannual Effluent Release Reports for the period January 1, 1996 through December 31, 1996, and verified that they were submitted within the required time frame. During the onsite inspection, the inspector noted that the report for the second half of 1996, dated February 25, 1997, incorrectly made reference to the first half of 1996. The inspector verified the data were representative of the second half of 1996. The licensee immediately corrected the typographical error and resubmitted the second half 1997 semi-annual effluent release report in a letter to the NRC dated March 24, 1997. Although the minimum reporting requirements of 10 CFR 70.59 were met, the inspector observed that the licensee used only selected portions of the report format guidance specified in Regulatory Guide 4.16, Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluents From Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants, Rev. 1, December 1985. Subsequent semi-annual reports will be reviewed against the reporting format guidance in Regulatory Guide 4.16.

The inspector compared the total quantities of liquid and gaseous effluent discharges in 1996 with previous years. The data are summarized in Table 1 below.

Table 1: Effluent Summary for General Electric Company Nuclear Energy Production (1993-1996)

Effluent	Nuclide	Quantity Released (microcuries, μCi)			
		1993	1994	1995	1996
Gaseous	U-234	7.31E+01	1.04E+02	9.56E+01	9.42E+01
	U-235	2.85E+00	4.06E+00	3.84E+00	3.71E+00
	U-236	2.54E-02	3.69E-02	1.84E-02	1.21E-01
	U-238	1.16E+01	1.65E+01	1.60E+01	1.44E+01
	Total	8.76E+01	1.25E+02	1.15E+02	1.12E+02
Liquid	U-234	8.19E+04	7.19E+04	6.51E+04	4.97E+04
	U-235	3.19E+03	2.81E+03	2.61E+03	1.96E+03
	U-236	2.89E+01	2.54E+01	1.21E+01	6.42E+01
	U-238	1.30E+04	1.14E+04	1.11E+04	7.60E+03
	Total	9.81E+04	8.61E+04	7.88E+04	5.93E+04

The total quantity of uranium discharged in gaseous effluents in 1996 was 112 μCi . Since 1994, there has been a slight decrease in the total quantity of uranium discharged in gaseous effluents. By using the USEPA's COMPLY code, the licensee estimated an offsite dose of approximately 0.2 mrem. The estimated dose was based on the total quantity of gaseous effluents released from the facility in 1996 to a maximally exposed receptor. This estimated dose was significantly less than the NRC's new dose constraint of 10 mrem for air emissions, as specified in 10 CFR 20.1101(d).

The total quantity of uranium discharged in liquid effluents in 1996 was 5.93E+04 μCi . Since 1993, there has been a decrease in the total quantity of uranium discharged in liquid effluents. The licensee did not calculate a dose based on the total quantity of liquid effluents released from the facility in 1996.

c. Conclusions

Total quantities of radioactive liquid and gaseous emissions from the facility have been decreasing since 1994. In 1996, the estimated dose to a maximally exposed offsite receptor was less than 10% of the 10 CFR 20.1101(d) dose constraint which indicated that the licensee's gaseous releases were ALARA.

2. Effluent Controls, Procedures, and Instrumentation

a. Inspection Scope

The inspector reviewed the licensee's controls and procedures for sampling and analyzing liquid and gaseous discharges from the facility. In addition, the inspector reviewed the licensee's readiness for sampling and analyzing effluent discharges from the DCF which was currently in the final stages of construction.

The licensee was required to sample and analyze discharges via the gaseous and liquid pathways in accordance with Chapter 5, Part 1 of the license application. Specifically, Section 5.1.1 outlined airborne effluents and exhaust systems from the uranium processing areas. Each exhaust stack from uranium processing areas was required to be continuously sampled from a point between the final HEPA filter and the discharge to the atmosphere. Table 5.1 of the Application specified the collection frequency, parameters of interest, action levels, and detection limits. Depending on the particular stack, the filters in the stack samplers were required to be collected at least daily or weekly and measured for gross alpha and beta activity. Additionally, Section 5.1.2 of the Application described the treatment process, sampling and analytical controls for treated process liquid waste.

b. Observations and Findings

(1) Fuel Manufacturing Operations (FMO)

The inspector reviewed selected procedures and verified that the action levels and provisions for collecting and analyzing liquid and gaseous effluent samples were in accordance with the license application.

In addition, the inspector reviewed selected weekly composited analytical results from January 1996 to February 1997 for discharged liquid effluent from the final process lagoons, aeration basin and the site dam. The inspector noted that total uranium, gross alpha, and gross beta concentrations in the samples were well below the specified action levels.

The inspector selectively reviewed weekly stack program reports covering the period from September 1996 - February 1997. Based upon the records reviewed, the inspector noted that the specified action level had been exceeded during the period January 10-16, 1997 on the stack associated with the new Decontamination and Volume Reduction Facility (DVRF). The weekly average sample result for the DVRF stack was $9.73E-10$ $\mu\text{Ci}/\text{cc}$ which exceeded the licensee's weekly average action level of $3.0E-12$ $\mu\text{Ci}/\text{cc}$. The high activity was probably due to the disturbance of the settled material in the ductwork during system startup. The material in the ductwork had settled due to the long period of inactivity. The licensee's corrective actions were acceptable.

In addition, the inspector reviewed the quarterly quantities of gaseous waste effluents released in 1996 and the first quarter of 1997. The inspector verified that the gaseous release quantities were less than the license application limit of 1250 $\mu\text{Ci}/\text{quarter}$. In 1996, the maximum quarterly quantity release was 34.1 μCi which occurred during the third quarter. The total quantity of uranium

released during the first quarter of 1997 was 36.1 μCi . From the data above, it was apparent that the licensee was well below the license application's quarterly limit.

(2) Dry Conversion Facility (DCF)

In addition, the inspector toured the DCF to determine if adequate gaseous and liquid sampling equipment and procedures were installed, functionally tested, and operationally ready for startup.

The inspector noted that there will be three gaseous release points from the DCF: (1) HVAC discharge from the DCF main building (uranium and HF samples); (2) discharge from the washing column (uranium and HF samples); and (3) discharge from the emergency scrubber (HF sample). The DCF HVAC system exhausts building air to the atmosphere through a single stack mounted along the side and roof of the building. The stack did not penetrate the roof of the building due to the potential concerns for water intrusion. Air is passed through two sets of high efficiency particulate air (HEPA) filter banks before it is exhausted to the atmosphere. The four foot diameter stack was designed to carry 28,645 cubic feet per minute (cfm) of air. The sampling points for HF and particulate matter (uranium) were located in the horizontal section of the duct and approximately 20 feet (ft) downstream of the 90 degree bend where the duct penetrated the DCF building wall. The licensee indicated that a single point sampling probe located in the center of the duct for the collection of particulate matter should be sufficient for obtaining a representative sample due to the turbulent flow in the duct. The inspector reviewed the licensee's evaluation, which made appropriate references to applicable ANSI standards and use of chemical engineering references. Based on the assumptions of the rated efficiencies of HEPA filters for the removal of particles, the average size of the particles remaining in the exhaust stream after passing through the HEPA filters should be much smaller than five microns. Assuming that the inertial effects for particles less than five microns will be negligible, the particulate matter in the air stream may be considered as a gas. The licensee also predicted that the exhaust air in the stack will be turbulent and therefore the particulate matter containing the uranium is expected to be evenly distributed across the stack diameter. The inspector verified the licensee's calculation of the Reynolds Number which predicted the turbulent flow. Although, collecting a sample from a horizontal section of a duct is not ideal, the licensee's analysis justifying the sample probe location appeared to be acceptable.

While tracing the sample delivery line from the HVAC discharge back to the DCF main building, the inspector noted at least three 90 degree bends that could have been avoided. The licensee made note of the observation and indicated that the problem would be

corrected. From discussions with a licensee HVAC specialist, the inspector noted that the velocity profile measurements across the duct diameter had not been completed and the air flow probes had not been installed. In addition, the inspector noted that Dwyer rotameters had been installed, however, the licensee's rotameter calibration equipment was only compatible with Wallace rotameters. The HVAC specialist indicated that the Dwyer rotameters would have to be replaced with equipment compatible with the licensee's calibration equipment. In addition, the licensee had not completed revision to the surveillance, sampling and analysis procedures for the DCF.

The inspector also traced the sample delivery line associated with the discharge from the washing column. Although unnecessary 90 degree bends were not observed, the inspector did note similar concerns as discussed above for the HVAC discharge.

The inspector also toured the hydrofluoric acid tank system facility and noted that installation of the liquid sampling equipment had not been completed. In addition, sampling and analysis procedures were still in the development process. The licensee was also evaluating what modifications to make for transporting ten percent HF acid solutions to the Waste Water Treatment Facility.

c. Conclusions

Releases of gaseous radioactive materials from the facility were significantly less than the license application quarterly limit. In addition, total uranium, gross alpha, and gross beta concentrations in liquid effluent samples were well below the specified action levels. Both of these parameters indicated that licensee's effluent control program was effective.

Equipment installation, functional testing, and procedure development for the collection and analysis of gaseous and liquid samples associated with the DCF were not ready to support operation of the facility.

3. Information Notices (92701)

a. Inspection Scope

The inspector reviewed the following Information Notice (IN) to determine if the information had been received by the licensee:

- IN 97-04: Implementation of a New Constraint on Radioactive Air Effluents, dated February 24, 1997.

b. Observations and Findings

The inspector determined that Information Notice 97-04 had been received by the licensee, reviewed for applicability, distributed to appropriate personnel, and that action, as appropriate, was taken or scheduled.

c. Conclusion

The licensee's actions were appropriate.

4. Followup on Previously Identified Issues (92701)

a. Inspection Scope

The inspector reviewed the following unresolved item (URI):

70-1113/96-07-01: Determine whether or not the strong tight container identified as DOT 12B-30 satisfied the packaging requirements specified in 49 CFR 173.410 and 173.411 for an industrial package Type 1.

b. Observations and Findings

The inspector reviewed the licensee's evaluation of the packaging requirements. It was determined that the DOT 12B-30 package conformed to 49 CFR 173.410 requirements. The container in question was equivalent to a 4G container. The 12B-30 container was made from fiberboard that incorporated an inner container consisting of a one gallon metal can. The shipment in question involved a limited quantity of radioactive material. Therefore, the packaging requirements for limited quantity shipments were not required to be transported via IP-1 classified containers (49 CFR 173.411), but were required to be shipped in accordance with 49 CFR 173.410.

c. Conclusions

The licensee's analysis was acceptable. This item is closed.

III. Management Meetings

A. Exit Interview

The inspection scope and results were summarized on March 27, 1997, with those persons indicated in the Attachment. The inspector described the areas inspected and discussed the inspection results, including the likely informational content of the inspection report with regard to documents and/or processes reviewed during the inspection. Although proprietary documents and processes were occasionally reviewed during this inspection, the proprietary nature of these documents or processes has been deleted from this report. Dissenting comments were not received from the licensee.

During a telephone conversation on April 7, 1997, the licensee informed the inspector that a vegetation sample required by the license application to be collected semi-annually was not collected in November 1996. The licensee was contacted telephonically on April 15, 1997, and informed that the failure to collect and analyze the vegetation sample would be identified as a non-cited violation of license application requirements.

ATTACHMENT

1. PERSONS CONTACTED

Licensee Personnel

*D. Brown, Team Leader, Environmental Project
 *T. Crawford, Senior Environmental Engineer
 *D. Dowker, Team Leader, Environmental Process Team
 *R. Foleck, Senior Licensing Specialist
 G. Fornasiero, Engineer, Packing and Transportation
 *D. Hassler, HVAC Supervisor
 C. Kipp, General Manager, GE-NEP
 *A. Mabry, Principal Nuclear Safety Engineer
 *C. Monetta, Manager, GENE Environmental Health and Safety (EH&S)
 *L. Paulson, Manager, Nuclear Safety
 *L. Quintana, Manager, Fabrication Product Line
 R. Reda, Manager, Fuels and Facility Licensing
 *G. Sbrocco, EH&S Engineer
 *H. Shaver, Nuclear Safety Engineer
 *H. Strickler, Manager, Site EH&S
 *K. Theriault, Manager, Quality Assurance and Chemet Laboratory
 C. Vaughan, Project Manager, EH&S- New Facility Licensing/Safety

Other licensee employees contacted included engineers, technicians, production staff, security, and office personnel.

*Denotes those present at the exit meeting on March 27, 1997

2. INSPECTION PROCEDURES USED

IP 83822 Radiation Protection
 IP 88035 Radioactive Waste Management
 IP 88045 Environmental Protection
 IP 92701 Followup

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-1113/96-07-01	Closed	URI - Determine whether or not the strong tight container identified as DOT 12B30 satisfied the packaging requirements specified in 49 CFR 173.410 and 173.411 for an industrial package Type 1.

70-1113/97-03-01	Open	IFI - Review licensee's internal dose assessment of the CaF ₂ basin excavation equipment operators.
70-1113/97-03-02	Closed	NCV - Failure to collect a vegetation sample in accordance with Sections 5.2.2.3 and Table 5.1 of the Application.

4. LIST OF ACRONYMS

CAA	Controlled Access Area
CaF ₂	Calcium Fluoride
cfm	cubic feet per minute
DCF	Dry Conversion Facility
DHENR	Department of Health, Environment, and Natural Resources
DVRF	Decontamination and Volume Reduction Facility
EAL	Environmental Action Level
EH&S	Environment, Health & Safety
EPA	Environmental Protection Agency
FMO	Fuel Manufacturing Operations
FSS	Final Status Survey
GE-NE	General Electric-Nuclear Energy
GE-NEP	General Electric-Nuclear Energy Production
HF	Hydrofluoric Acid
HVAC	heating, Ventilation, and Air Conditioning
IFI	Inspector Follow-up Item
IP	Industrial Package
IR	Inspection Report
MDC	Minimum Detectable Concentration
NCV	Non-Cited Violation
OSHA	Occupational Safety and Health Administration
ppm	parts per million
SAS	Stationary Air Sampler
URI	Unresolved Item