



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-160/95-03

Licensee: Georgia Institute of Technology
225 North Avenue
Atlanta, GA 30332

Docket No.: 50-160

License No. R-97

Facility Name: Neely Nuclear Research Center

Inspection Conducted: November 1-3, 1995

Inspector: A. Gooden
A. Gooden

11/30/95
Date Signed

Accompanying Personnel: E. Testa

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

12/1/95
Date Signed

SUMMARY

Scope:

This routine, announced inspection involved a review of the operational readiness status of the licensee's emergency preparedness program, and evaluation of the licensee's annual emergency response drill. The following program elements were assessed to determine the state of emergency preparedness: emergency response training; maintenance of emergency cabinets/equipment; and the review, approval, and distribution of changes to the Emergency Plan, emergency procedures, and the notification roster.

Results:

Within the areas reviewed, no violations, deviations, or exercise weaknesses were identified. However, the following areas were discussed with the licensee for improvement: 1) press release, 2) documentation and distribution of pocket dosimeters for response personnel, 3) medical response, and 4) implementation of a notification message form.

Enclosure

In response to the simulated accident, the licensee successfully implemented the Emergency Plan and procedures to demonstrate an adequate level of readiness for responding to emergencies. The assessment equipment and facilities were properly maintained to ensure availability and operability. Accountability and access control were established in a timely manner. The Emergency Director demonstrated good command, control, and an effective interface with members of the emergency organization.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *R. Ice, Manager, Office of Radiation Safety
- E. Jawdeh, Research Scientist
- *R. Karam, Director, Neely Nuclear Research Center
- *D. Parker, Reactor Supervisor
- *B. Statham, Engineer

Other licensee employees contacted during this inspection included campus police and administrative personnel.

Nuclear Regulatory Commission

- *E. McAlpine, Chief, Fuel Facilities Branch

*Attended Exit Interview

An index of abbreviations used throughout this report will be found in the last paragraph.

2. Emergency Plan and Implementing Procedures (82745)

The review, approval, and distribution of Plan and procedure changes was examined to determine whether significant changes were made since the October 1994 inspection, to assess the impact of any program changes on the overall state of emergency preparedness at the facility, and determine if the Plan and procedures were revised to reflect those program changes. Requirements applicable to this area are found in 10 CFR 50.54(q) and Section 10.4 of the Emergency Plan.

The inspector determined by both documentation review and discussion with a licensee representative that revisions were made to the Plan (Rev. 3, dated October 27, 1994), and EP 6010 (Rev. 3, dated December 8, 1994). The beforementioned changes were distributed to onsite and offsite copy holders, including the Region II Project Inspector, in a timely manner. However, revisions were not provided to NRC in accordance with Section 10.4 of the Plan and 10 CFR 50.4(b)(5). Section 10.4 of the Plan states that "Applicable portions of the plan, agreements, and implementing procedures shall be distributed to authorized agencies and support organizations, and any revisions to implementing procedures affected by the plan shall be approved by the Nuclear Safeguards Committee and sent to authorized recipients within 30 days after the revised plans have been issued." 10 CFR 50.4(b)(5) requires that Emergency Plan and related submittals be as follows: "the signed original to the Nuclear Regulatory Commission, Document Control Desk, Washington, DC 20555, two copies to the appropriate Regional Office, and one copy to the appropriate NRC Resident Inspector if one has been assigned to the site of the facility." The lack of submittal

in accordance with the above criteria resulted in no updates to the NRC Region II IRC copy of the Plan and EP 6010. At the time of the inspection, the licensee contact indicated an additional search of the submittal files should reveal the appropriate documentation. Based on an additional search of the referenced file, the licensee was unable to locate correspondence to demonstrate that changes were provided as described above. The licensee contact attributed the failure to a fundamental misunderstanding regarding the distribution requirements for changes. The licensee was informed on November 29, 1995, that based on a further review of this matter, no violation occurred. The basis for this determination was under previous enforcement criteria, a severity level V violation would have resulted. However, in light of the revised NRC enforcement policy, the category of severity level V violation was deleted. Additionally, the referenced changes were not determined to reduce the effectiveness of the Plan or procedures. The Fuel Facilities Branch Chief indicated that a violation was not identified, but emphasized corrective actions were necessary to ensure that any changes to the Emergency Plan and procedures are distributed in accordance with the requirements.

The inspector reviewed the administrative program governing the review, approval, and distribution of changes to the Plan and EPs. A review of the NSC meeting documentation for October 27, 1994 and December 8, 1994, disclosed that changes to the Plan and EP were approved in accordance with Section 10.4 of the Emergency Plan. However, as previously mentioned, the inspector noted that changes were not being sent to NRC in accordance with 10 CFR 50.4(b)(5) and Section 10.4 of the Emergency Plan. According to the licensee and a review of the revised Plan, changes were primarily exposure limits and terminology associated with revised 10 CFR Part 20 and EPA-400 Manual of Protective Action Guides and Protective Actions For Nuclear Incidents. The inspector discussed the results of the onsite Plan review and stated that changes made to reflect revised federal guidance was not considered a decrease in Plan effectiveness; however, the formal NRC review and approval would be via separate correspondence.

According to Section 8.5 of the Plan, a quarterly update and verification is performed of the Emergency Notification Roster (phone numbers and point of contacts). Although roster verification documentation for the period November 1994 to September 1995 was not available, the inspector reviewed correspondence which transmitted the updated roster to various onsite and offsite copy holders. The inspector checked various locations within the NNRC Building as reflected on the control distribution listing and determined that the current notification roster (dated September 1995) was posted.

Regarding offsite support agreements, Section 8.3 of the Plan requires agreement letters with offsite support agencies be updated on a biennial basis. The licensee currently maintains an agreement with Grady Memorial Hospital for medical emergencies involving radioactive materials. The referenced agreement was updated during August 1994.

The ECC Copy of the Plan and selected EPs were examined and determined to be current revisions.

One violation was identified.

3. Emergency Facilities and Equipment (82745)

Facilities and equipment were inspected to determine whether the licensee's ECC, emergency response equipment, instrumentation, and supplies were maintained in a state of operational readiness, and to assess the impact of any changes on the emergency preparedness program. Requirements applicable to this area are found in Section 10.5 of the Emergency Plan and various implementing procedures.

The licensee maintained two kits for emergency use. One kit, located in the vestibule of the Reactor Building, contained primarily protective clothing, decontamination supplies, barrier ropes, etc. A second kit, located in the ECC, contained portable survey instruments, protective clothing, sampling material, dosimetry, etc. Two air packs located in the ECC were verified as full and ready for use. With one exception, no discrepancies were noted with emergency kits. The one exception was noted during the emergency drill (see Paragraph 5) involving the insufficient quantity of SRPDs. The inspector's review of documentation for the emergency kit inventory disclosed that the inventories were performed on a quarterly basis.

Additional records reviewed by the inspector included test documentation and calibration records for area radiation monitors and air sampling equipment. Test documentation was also reviewed for the backup power provided via the emergency power generator. The referenced equipment testing was performed at the required interval in accordance with procedures, and equipment problems or discrepancies were corrected in a timely manner. Periodic testing and surveillance activity was tracked via computer generated work order requests. The referenced tracking system generated work orders in advance of the due date (generally 30 days prior to due date) with weekly updates and printouts provided to the MORS. The work orders contained the date last done, date to be completed, and date actually completed. The work order status was tracked by the MORS to ensure surveillance activity was performed in accordance with requirements.

As further assessment of equipment maintenance, the inspector verified the location and condition of fire extinguishers by comparing the fire extinguisher inventory listing (Procedure RS-108) with the actual extinguisher location during a facility tour. Based on visual inspection of cylinders and pressure readings, each location selected (NNRC Building first floor and basement) was as described on listing and appeared to be operational.

Regarding facility and/or equipment changes since the last inspection, during the ECC tour, the licensee revealed that a second telephone was added to provide additional communications capability. The inspector verified the operability and considered the additional phone as a program enhancement in the area of communications during an emergency.

No violations or deviations were identified.

4. Emergency Response Training (82745)

Emergency response training was reviewed to determine if the licensee was providing training in accordance with the Emergency Plan. The requirements for training are found in Section 10.1 of the Plan.

According to licensee training records, all personnel assigned to the Emergency Notification Roster were trained. The inspector interviewed the licensee representative with responsibility for emergency response training to review the material presented during the annual training sessions. The inspector's review disclosed that training sessions were conducted for all NNRC personnel on October 17, and October 19, 1995. According to the training outline, the subject matter included a discussion of the Emergency Plan, a review of all current emergency procedures, EALs, emergency responsibilities, and a review of the event classification system.

Regarding emergency response support training, Section 10.1 of the Plan required biennial training in radiation safety and NNRC emergency procedures for the GTP and AFD. A review of the training instructor's outline indicated that training included a discussion regarding the types of radiation, exposure limits, radiation warning signs, and specific actions to take in responding to events at the NNRC. According to training attendance sheets, the referenced training was provided to AFD and GTP personnel during August 1995. Consequently, the next biennial training is required during calendar year 1997.

No violations or deviations were identified.

5. Emergency Response Drill (82745)

Section 10.2 of the licensee's Emergency Plan required that drills be conducted annually to test the adequacy of emergency procedures and to ensure that emergency organization personnel are familiar with their duties. Further, the Emergency Plan required that at least biennially, drills contain provisions for coordination with offsite emergency organizations for testing communications and notification procedures with offsite support agencies.

The scenario was reviewed in advance of the exercise and was discussed with licensee representatives prior to the exercise. No major problems were identified during the review, but minor inconsistencies became apparent during the exercise. The inconsistencies failed to detract from the overall performance of the licensee's emergency organization.

The inspector discussed the timeliness of the scenario submittal with licensee representatives. Although a requirement specific to scenario submittal does not exist, licensees were requested by letter dated April 22, 1992, to provide scenario details at least 30 days prior to the scheduled date of the exercise. The 30 days advance facilitates scheduling and provides sufficient time before the exercise to permit appropriate NRC review. The proposed scenario and objectives for the November 2, 1995 exercise were submitted for review on October 20, 1995 (12 days in advance of the exercise date). As a result, the inspector discussed the details of scenario submittal included in the aforementioned letter with the Director of the NNRC for future exercises. The scenario was adequate to test the capabilities of the onsite emergency organization, the offsite medical support facility, and provided sufficient emergency information to offsite agencies (State, local, and NRC) for testing communications capabilities.

On November 2, 1995, the licensee conducted the annual emergency drill. This exercise involved Grady Memorial Hospital and limited participation with State (DNR/EPD and GEMA), local (A/FEMA), and NRC Operations Center personnel. With the exception of Grady Memorial Hospital, offsite participation was limited to communications only. The simulated accident started at approximately 8:35 a.m. and terminated at 9:40 a.m.. The scenario details simulated a fuel handling accident within containment. During the process of transferring fuel, a fuel element dropped out of the transfer cask resulting in severe damage to the element, an injured/contaminated employee, and multiple radiation alarms. The inspector observed the licensee's actions in the following areas:

- ECC activation and operation
- Notification and communication with offsite authorities
- Interface with on-scene response personnel from medical support facility
- Facility evacuation and accountability
- On-scene response by health physics personnel
- Event recognition and classification

In response to the alarm, immediate notification was made via PA to evacuate the building. The GTP was notified at 8:44 a.m. and promptly (8:47 a.m.) responded to establish access control to the NNRC. Accountability was initiated immediately after the evacuees convened at the designated assembly point and completed in a timely manner. The activation of the ECC was orderly and timely.

The inspector observed good interface between the alternate ED and the emergency organization in the implementation of Plan and procedures. The assessment of accident conditions and the resulting event declaration by the alternate ED was both timely and correct. The inspector observed that notification procedures had been established for onsite and offsite organizations and were discussed in EP 6100 "Emergency Notification." All notifications were completed within the required time regime. However, the inspector noted that the

notification to the State DNR/EPD did not include details regarding the emergency class. The inspector discussed with the licensee as an improvement item for notifications, the development of a standard emergency notification message form that include minimum but appropriate details regarding the emergency (e.g. classification, time of event, current conditions, etc.).

During the initial deployment of response personnel (health physics and GTP), the distribution and tracking of personnel dosimetry was considered an area for improvement due to:

- No tracking mechanism for maintaining personnel SRPD reading and/or exposure data
- Inadequate supply of SRPDs were available for issuance to response personnel

In response to the inadequate supply of SRPDs, the licensee discussed with the inspector the availability of additional SRPDs that were inadvertently left behind in the main office area following the building evacuation announcement.

The inspector observed the communications between the HP responders, the Control Room, and Command Center and judged them to be timely and appropriate. Message information was appropriate and information expediently transferred with a minimum of extraneous details and no observable degradation of signal strength while using the two-way hand held radios. The PA announcements were loud and clear inside the containment and inside the airlock.

The HP technicians arrived promptly and assessed the radiation dose levels and recognized the difficulty of obtaining accurate contamination levels in the airlock with an elevated background. The GTP arrived quickly and assisted in the patient transfer to the ambulance stretcher. The police also provided backup communications and adequate security during the ambulance entrance and exit from the reactor complex. The inspector did not observe typical first aid activities expected for an injured individual with a compound leg fracture such as comforting the patient and checking vital signs (e.g. blood pressure, respiration, heart rate, checking eyes for pupil dilation and immobilization of the fractured leg prior to moving). The lack of performance was attributed to the artificiality of the simulated injury (compound fracture of the leg and information used on the message card).

In response to the simulated accident, one press release was issued by the Media Relations Office. Based on the inspector's review of the press release and a discussion with the alternate ED, although the release was reviewed prior to simulated issuance by the Media Relations Office, minor inconsistencies were included. In addition, details

regarding the different levels of classification were incorrect. The inspector discussed press release as an area for improvements. The licensee responded that additional training would be provided to the PIO.

As a program enhancement, the licensee conducted a recovery drill (table top format) at the end of the exercise. The alternate ED, NNRC management, and staff executed good discussions regarding contingency planning for returning the fuel element to the transfer cask or shielding. Good command and control was demonstrated by the alternate ED during the duration of the exercise.

At the conclusion of the exercise, the licensee conducted a critique that was attended by both NNRC management and staff, and GTP participants to discuss areas for improvements.

No violations or deviations were identified.

6. Action on Previous NRC Inspection Findings

- a. (Closed) IFI 50-160/93-03-03: Review training for personnel assigned as drill controller.

A controller job description was developed and implemented for providing guidance and directions to personnel filling the role of a drill controller. Controller training was conducted on October 17, 1995. During the 1995 exercise, there was no indication of controller prompting or provision of decisional information to exercise players. Consequently, the corrective actions were effective for closure of this item.

- b. (Closed) EW 50-160/94-04-02: Failure to classify the event in a timely manner.

All personnel with responsibility for Plan implementation received training in EALs, responsibility in event recognition and classification, and the use of series 6000 emergency procedures. During the exercise, the inspector observed the event recognition and classification to be both timely and correct. Approximately eight minutes after the initiating conditions for the emergency were provided to the alternate ED, the Alert classification was declared based on the licensee's event classification procedure. The licensee's actions in the area of event classification were effective for closure of this item.

7. Exit Interview

The inspection scope and results were summarized on November 3, 1995, with those persons indicated in Paragraph 1. The inspector discussed areas for improvement and the lack of documentation to show that Plan and procedure submittals to NRC were in accordance with 10 CFR 50.4(b)(5) and Section 10.4 of the Emergency Plan (Paragraph 2).

The lack of documentation was discussed in detail in light of a previous NCV for failure to submit emergency procedure changes to NRC in accordance with 10 CFR 50.4(b)(5) and Section 10.4 of the Emergency Plan. The inspector informed the licensee that an additional review and discussion with regional management would determine if a finding had resulted. Based on the review and discussion with regional management and headquarters, on November 29, 1995, the licensee was informed that no violation occurred (Paragraph 2). The areas inspected were described in detail including the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Status</u>	<u>Description/Reference</u>
50-160/93-03-03	Closed	IFI - Review training for personnel assigned as drill controller. (Paragraph 6).
50-160/94-04-02	Closed	EW - Failure to classify the event in a timely manner (Paragraph 6).

8. Index of Abbreviations Used In This Report

A/FEMA	Atlanta/Fulton County Emergency Management Agency
AFD	Atlanta Fire Department
DNR/EPD	Department of Natural Resources/Environmental Protection Division
EAL	Emergency Action Level
ECC	Emergency Command Center
ED	Emergency Director
EPA	Environmental Protection Agency
EP	Emergency Procedure
EW	Exercise Weakness
GEMA	Georgia Emergency Management Agency
GTMR	Georgia Tech Media Relations
GTP	Georgia Tech Police
HP	Health Physics
IFI	Inspector Followup Item
IR	Inspection Report
IRC	Incident Response Center
MORS	Manager Office of Radiation Safety
NCV	Non-cited Violation
NNRC	Neely Nuclear Research Center
NRC	Nuclear Regulatory Commission

NSC	Nuclear Safeguards Committee
PA	Public Address System
PIO	Public Information Officer
Rev.	Revision
SRPDs	Self Reading Pocket Dosimeters

Attachment:
Scenario and Exercise
Objectives

EMERGENCY EXERCISE

Nov. 2, 1995

- Objectives:
1. To test the NNRC Emergency Organization's response to an "ALERT" emergency event;
 2. To demonstrate that an alternate Emergency Director can handle an emergency situation;
 3. To demonstrate that NNRC personnel are trained properly and can respond appropriately to emergency situations;
 4. To demonstrate that procedures are adequate and can be followed;
 5. To demonstrate that emergency communications are appropriate.

NOTE: This exercise is limited to the initial phase of emergency response. Remediation of the emergency is completed with a Table Top drill.

SET-UP Abe Doe (Reactor Operator) is in Reactor Control Room. John Doe and Pete Doe are on Reactor Main Floor in the process of transferring fuel.

8:30 am OPS/Cont. hands card one to Abe Doe.

CARD ONE: You are in the process of transferring fuel. Two operations people are doing the transfers on the main floor. Suddenly, multiple area radiation alarms sound from within the containment facility. Four area monitors are pegged (i.e. >100 mR/h).

Expected Action:

1. Abe Doe uses the PA to announce that an emergency has taken place and that by procedure, personnel must evacuate the facility.
2. Alternatively, Abe Doe may call management and management will announce the emergency on the PA.
3. Abe Doe or management calls GaTech police to announce emergency.
4. Abe Doe checks with operations people to assess incident before evacuating.

8:32 OPS/Cont. hands card two to Abe Doe (either as he communicates to operations people or as he exits containment).

8:35 Staff evacuates to check-in point and is surveyed.

Expected Action

1. All personnel report and are individually surveyed.
2. Either in response to ED query or by volunteering the information, Abe communicates the following information from card two to the ED.

CARD TWO: We have had an accident in the containment building while transferring fuel. A fuel element has dropped out of the transfer cask. I have isolated the building; four area monitors are pegged! John Doe is hurt and needs medical attention. Pete and I have pulled John into the airlock. Pete Doe is with him.

Expected Action:

1. Police in conjunction with HP-1 respond to injury. Admin. First Aid. Accompanied by OPS/Controller.
2. Have police call for immediate ambulance service from Grady.
3. ED selects response team of OPS + HP 2 and Proceeds to Command Center. Accompanied by MNGMT/Controller.

8:40 Command Center Made Operational

Expected action

1. OPS + HP-2 open emergency cabinet, recover radios and survey equipment.
2. OPS + HP-2 at ED's direction proceeds to the air lock. with instructions to survey area and report back
3. Communications established with OPS + HP team at air lock

8:45 OPS + HP-2 reports (Based upon suitable assessment time in airlock area OPS/Controller gives card three to OPS + HP-2 team).

CARD THREE: John Doe has compound fracture of leg. John is inside of main air lock. Policeman and HP-1 are tending to John. The fuel element is visible from the air lock window and appears to be severely damaged, i.e. the non-fuel assembly header is dented. The element is located between plug storage area and truck door and we anticipate exposures of 120 R/hr at 1 meter from the assembly. The exposure within the interlock is 10 mr/h. John says the fuel element assembly struck him during the accident.

Expected Action:

1. ED dispatches HP's to assess radiation levels at accident site and away from accident --especially at containment wall on the outside.
2. ED instructs all emergency team members not to enter containment building.
3. Instruct police to keep open ambulance path to back of building
4. Call Grady Emergency request ambulance if not already done. Alert Grady of imminent receipt of patient with possible radiological contamination.

9:00 OPS/Controller provides card four to HP-1 after reasonable assessment interval.

CARD FOUR: John Doe is contaminated on leg and shows low level cross contamination from first aid activities over other parts of his body. He appears woozy and weak!

Expected Action

1. ED, police on staff may indicate " Possible shock. Keep head lower than feet" "If cold, cover John with blanket".
2. Ambulance arrives
3. Instruct Police/HP-1 to tell EMT, known broken leg, possible shock and patient contaminated. Recommend HP accompany patient to hospital.
4. EMT respond

9:05 Assessment Classification Completed

Expected Action

1. Declare Emergency-- ALERT
 - a. Apply all Proc. 6030
 - b. Apply Proc. 6100, Section 5.10.5 "Severe Fuel Damage"
2. Initiate Notifications
 - a. GDNR/GEMA/A-FEMA
 - b. NRC
 - c. GaTech Med. Relations

9:15 - 9:25 HP building/site survey completed. OPS/HP-2 report in to ED.
MNGMT/Controller gives OPS/HP -2 card five:

CARD FIVE: Site survey DATA sheet. No contamination anywhere outside the containment building. Radiation level in the main airlock is 10 mR/h. There is no contamination on the floor of the air lock. Radiation level outside the containment truck door is 20 mR/h. Radiation levels everywhere else are normal, i.e., background.

Expected Action

1. Clear all personnel from truck door area
2. Ambulance leaves
3. Call for Management Meeting to initiate planning for recovery from the emergency.

9:30 MNGMT/Controller hands card six to ED

CARD SIX: The immediate emergency exercise is over. You are to proceed with recovery actions as a Table Top Drill.

Note: Both controllers will assume roles as managers at this point and be available to answer questions.

Expected Action

1. ED can request technical assistance as needed.
2. Plan a step by step procedure for entering the containment building to
 - a. Determine whether or not fission products have been released inside the building.
 - b. Devise a method for retrieving the exposed fuel element and placing it in a cask to be transferred the storage pool.
3. Plan should minimize exposure to personnel.

10:00 Emergency Ends

Expected Action

1. PA announcement. OK to enter building.
2. Hold meeting to critique performance