U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-289/84-30

Docket No. 50-289

License No. DPR-50 Priority -- Category C

Licensee: GPU Nuclear Corporation

P. O. Box 480

Middletown, Pennsylvania 17057

Facility Name: Three Mile Island Nuclear Station, Unit 1

Inspection At: Three Mile Island and Harrisburg, Pennsylvania

Inspection Conducted: October 1-5, 1984

Inspectors: Nemen M. Terc, Exercise Team Leader, EPS — 1-16-85 date

I. Cohen, EPS, RI
J. Bell, TMI - NRC
K. Barr, TMI - NRC
J. Hawxhurst, EPS-RI
Leo Munson, PNL
Linda Munson, PNL
J. Will, PNL

Approved by: T. L. Harpster, Chief, EPS, DETP — 1/30/85 date

Inspection Summary:

Inspection on October 1-5, 1984 - Report No. 50-289/84-30

Areas Inspected: Routine announced emergency preparedness inspection and observation of the licensee's Emergency Exercise performed on October 3, 1984.

Results: The inspection involved 288 hours by a team of eight NRC inspectors and NRC contractor personnel. The licensee's emergency response actions for this exercise scenario were adequate to provide protective measures for the health and safety of the public. No violations were identified.

DETAILS

1.0 Persons Contacted

The following licensee representatives attended the exit meeting on October 5, 1984:

G. G. Baker, Manager Environmental Controls - GPUN
J. J. Bevelacqua, TMI Emergency Preparedness Manager
P. G. Christman, Manager - Plant Administration
G. J. Giangi, Manager Emergency Preparedness - GPUN
H. D. Hukill, Vice-President - TMI 1
G. A. Kuehn, Radiation Control Manager - TMI 1
S. Levin, Site Operations Director - TMI 2
R. L. Long, Vice-President Nuclear Assurance - GPUN
K. A. Meyer, Nuclear Safety and Compliance Staff

2.0 Emergency Exercise

The Three Mile Island Nuclear Station, Unit 1 full scale exercise was conducted on October 3, 1984 from 8:00 a.m. until 4:30 p.m.

2.1. Pre-exercise Activities

Prior to the emergency exercise, NRC Region I representatives had telephone discussions with licensee representatives to review the scope and content of the exercise scenario. As a result, revisions were made by the licensee to improve certain areas, e.g., emergency classification of scenario events.

In addition, NRC observers attended a licensee briefing for licensee controllers and observers on October 2, 1984, and participated in the discussion of emergency response actions expected during the various phases of the scenario. The licensee stated that certain emergency actions would be simulated and that controllers would intercede in activities to prevent disturbing normal plant operations.

The exercise scenario included the following events:

- Seismic event resulting in reactor-coolant-pump-seal failure;
- Failure of the reactor building purge valves in the open position providing for a radioactive release pathway to the environment;
- LOCA with consequent fuel degradation;
- Large off-site releases of radioactive gases; and
- Contaminated and injured individuals.

The above events caused the activation of the licensee's emergency facilities and permitted the state to exercise some of their response functions. Off-site agency activities were minimal during this exercise.

2.2 Exercise Observation

During the conduct of the licensee's exercise, NRC team members made detailed observations of the activation and augmentation of the emergency organization; activation of emergency response facilities; and actions of emergency response personnel during the operation of the emergency response facilities. The following activities were observed:

- Detection, classification, and assessment of scenario events;
- Direction and coordination of the emergency response;
- Notification of licensee personnel and offsite agencies;
- Communications, information flow, record keeping and sample distribution;
- Assessment and projection of radiological doses, and protective action recommendations;
- Offsite, onsite, and inplant radiological surveys;
- Technical support to operations;
- Repair and corrective actions;
- First Aid and Rescue;
- Assembly and accountability of personnel;
- Radiological controls for emergency workers;
- Security and access controls; and
- Post-Accident sampling and analysis.

2.3 Findings

2.3.a. General

The NRC team noted that the licensee's activation and augmentation of the emergency organization; activation of the emergency response facilities; and actions and use of facilities were generally consistent with their emergency response plan and

implementing procedures. The team also noted the following areas where the licensee's activities were thoroughly planned and efficiently implemented:

- The degree of realism and free-play during the exercise was well maintained throughout all response tasks. Emergency Control Center personnel in the control room, e.g., Shift Supervisor, Reactor Operations, were prompt and effective in forming the initial response organization and taking actions to ameliorate the effects of the simulated accident. Personnel referred to emergency procedures, and later involved Technical Support Center (TSC) in reaching decisions, while actively pursuing alternative solutions.

- The scenario was well presented to players and professionally executed in the Control Room using audio-visual aids

- The TSC was manned rapidly and proficiently, and the TSC Coordinator effectively guided his engineering staff to provide technical support to the operations staff.

- Differences between TSC and Parsippany Technical Functions Center (PTFC), were discussed between the groups performing independent evaluations prior to passing on the recommendations to the Emergency Director (ED).

- The TSC maintained its role as the first line of technical support to the ED, and acted as laison between the PTFC and the technical group in the Emergency Operations Facility.

- Radiological control personnel in the Operations Support Center (OSC), made extensive and complete briefings to personnel entering radiologically hazardous areas in the plant, maintaining a good balance between personnel safety and a rapid response.

- In treating the injured and contaminated individual the participants gave priority to medical procedures without neglecting radiological considerations.

- Chemistry personnel anticipated the need for the proper valve line up of the Post Accident Sampling System (PASS), and accomplished the same in an efficient manner.

- The OSC was well organized, manning was adequate, continuous accountability was well maintained, and status boards and logs were properly kept.

- The Emergency Support Director (ESD) provided excellent direction and control of EOF activities.

- News releases were prompt and accurate.

- Technicians involved in offsite monitoring teams were proficient in their use of procedures, methods and equipment.

2.3.b. Areas for Improvement

The NRC Team findings in areas for licensee's improvement were as follows: (the licensee identified many of these areas during their critique of the exercise)

Control Room

- The Status Board in the Control Room was infrequently updated and seldom referred to. As a consequence, there were some isolated instances of delay in critical information flow, e.g., a request for a chemistry sample was not transmitted.

- The operators, in considering plant valve-line up changes, failed to use available plasticized system diagrams.

- Selected players in the ECC, TSC and CSC should be identified by title. This would also be desirable during real events.

Technical Support Center

- Calculations of purge-line-flow were performed using incorrect data. This occurred at the TSC and the PTFC.

- Plotting of trend data on saturation temperatures and degrees subcooling were performed incorrectly at the TSC.

- An unnecessary delay in the calculation of the flow rate through the purge valve line resulted from initial TSC reluctance to actively pursue a resolution independently from the PTFC.

- Water and toilet facilities are lacking in the TSC, and could result in inconvenience during a prolonged response.

- Habitability surveys were lacking in the TSC during the exercise.

- Emergency high range dosimeters were not issued to TSC personnel who were also involved in inplant activities. Although dosimetry would be provided at control points, individuals may need to transverse areas of the plant with unknown levels of radiation.

- The flow of information from the telephone communicator to the TSC Coordinator was somewhat delayed, and although a Log for incoming information was kept, there was no formal system in place to ensure that the TSC Coordinator received critical information on a timely manner. A similar situation was observed in the EOF pertaining to information from the TSC and its relay to Technical Functions Personnel.

- Telephone numbers for the PTFC were not readily found by the TSC staff. This resulted in an unnecessary delay in activating the PTFC.

- Means for establishing and maintaining accountability of TSC personnel were lacking. This could be complicated by the fact that some TSC members were sent out to assist OSC in-plant teams.

- Some technical reference information was not available at the TSC, e.g., in evaluating repair methods for a particular valve, the question of whether it had a bolted or a welded bonnet could not be resolved.

- Scenario data presented to the TSC staff was not always consistent with the simulated plant condition in the scenario. For example, raw data on primary coolant make-up water, primary coolant temperatures and pressures, steam generator temperatures and pressures and sump levels were not consistent with fuel failure conditions and release level information. In addition, dose rates at purge valves were not consistent with PASS sample results and time of fuel damage and core recovery. The TSC staff recognized these scenario inconsistencies, but not without time loss and some reduction in the effective use of technical talent.

Dose Assessment

- Simultaneous dose projection activities at the ECC and the EACC, resulted in delays due to different results. Time was required for deciding which results would be used for inclusion in the decision making process pertaining to protective action recommendations. The physical units of the radiological effluent monitor (RMG 24) transmitted on the off-site Base calculations Data Sheet did not agree with

those specified in Emergency Implementing Procedure EPIP 1004.7 and the units provided by the exercise scenario. This could lead to inaccurate dose projections.

- Meteorological parameter measurement of time intervals and duration were not always identified in the Dose Calculation Worksheet. This could result in misuse of meteorological data.

- The radiological effluent monitoring system was not found to be fully described in the Emergency Plan. The inclusion of flow diagrams, instrument location and specifications, as well as physical units and general conversion factors should also be considered.

OSC and Inplant Activities

- The paging system announcing emergency classification escalation was not audible in the stairways area connecting the ECC, TSC and OSC.

- A chemistry technician grasped an undiluted (i.e. highly radioactive) reactor coolant sample in order to position the same within the shield used to analyze the sample.

- The prevention of radioactive contamination by means of a step off pad was not efficient.

- Several technicians failed to monitor the air supply available to their self contained breathing apparatus, and as a consequence ran out of air while still in a highly airborne contaminated area. The technicians failed to recognize the hazard of the situation and made no attempt to leave the area. Instead, they tried unsuccessfully to exchange air cylinders but were apparently not familiar with the equipment.

- A radiation technician exited the laboratory leaving the BZA filter head unmonitored for almost one hour.

- A procedure for analyzing a relatively high radioactive gas sample was not available.

Emergency Operations Facility

- The boat used to transport the environmental monitoring team (EMT) along the river was found to be inadequate for shallow waters. As a consequence the team was unable to localize and measure the radioactive plume.

- Maps used by the EMTs were not marked with location landmarks which could be easily recognizable.

- A change in the scenario made in the midst of task completion resulted in mistakes and inaccurate information being given to players in the EMT.

2.4. Licensee's Exercise Critique

The NRC team attended the licensee's post-exercise critique during which key licensee controllers discussed their observations of the exercise. The NRC team concluded that the licensee demonstrated their ability for self-criticism, highlighting areas were improvement is indicated.

3.0 Exit Meeting and NRC Critique

Following the licensee's critique, the NRC team met with the licensee representatives listed in Section 1. The Team Leader summarized the observations made during the exercise, and discussed the areas described in Section 2.b.

The licensee was informed that no violations were observed and although there were areas identified for improvement, the NRC team determined that within the scope and limitations of the scenario, the licensee's performance demonstrated that they could implement their Emergency Plan and Emergency Plan Implementing Procedures in a manner that would adequately provide protective measures for the health and safety of the public.

Licensee management acknowledged NRC team findings and indicated that appropriate action would be taken regarding the identified improvement areas.

At no time during this inspection did the inspectors provide any written information to the licensee.