U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 89-27

Docket No. 50-353

License No. CPPR-107 Priority - Category C

Licensee: Philadelphia Electric Company
2310 Market Street
Philadelphia, PA 19101

Facility Name: Limerick Generating Station Unit 2

Inspection At: Limerick, Pennsylvania

Inspection Conducted: September 11-12 and 14-15, 1989

Inspectors: T. Dragoun
T. Dragoun, Senior Radiation Specialist — 10/6/89 date

Approved by: W. Pasciak
W. Pasciak, Chief, Facilities Radiation Protection Section — 10/6/89 date

Inspection Summary: Inspection on September 11-12 and 14-15, 1989 (Report No. 50-353/89-27)

Areas Inspected: Routine startup inspection of the radiological controls programs including: shield verification surveys, locked high radiation areas, coordination of activities, shipment of an Intermediate Range Monitor, TIP room radiation monitors, and worker heat stress.

Results: No violations were identified.

## DETAILS

### 1 0 Persons Contacted

#### 1.1 Philadelphia Electric Company

*G. Leitch, Vice President - LGS
*J. Spencer, Superintendent - Maintenance/I&C
*R. Dubiel, Superintendent - Plant Services
*J. King, Support Manager
*A. MacAinsh, Manager - Quality
*V. Warren, Test Engineer - Licensing
G. Murphy, Senior Health Physicist
R. Leddy, Applied Health Physicist
D. Fiorilla, Materials Section Support Engineer
A. Skapik, Materials Section Supervising Engineer
L. Wells, Radwaste Engineer
B. Stephenson, Radwaste Shipping Coordinator
J. Mallon, Health Physicist
S. Taylor, Applied HP Supervisor
B. Bolger, Senior Safety Engineer

#### 1.2 NRC Personnel

T. Kenny, Senior Resident Inspector
*L. Scholl, Resident Inspector
*R. Fuhrmeister, Resident Inspector

*Attended the exit interview on September 15, 1989.

### 2.0 Purpose

The purpose of this Unit 2 startup inspection was to review the implementation of the radiological controls programs with respect to the following elements:

-Shield Surveys
-Locked High Radiation Areas
-Coordination of Startup Activities
-Shipment of an IRM
-TIP Room area radiation monitors (ARM)
-Control of Heat Stress

### 3.0 Shield Surveys

During Inspection 89-20, concerns were expressed that the shield verification test program did not incorporate the recommendations in ANSI 6.3.1. In response, the licensee revised the associated Startup Test Procedure (#2STP-2.0). Implementation of this revised procedure was

reviewed through interviews with personnel and review of selected records. The inspector also reviewed the qualification of the technicians performing the surveys and the specialized instructions provided to perform the surveys.

Gamma and neutron dose rate data have been taken during heat up and at 20% reactor power. Plant power level has been limited due to chemistry control problems caused by cooling water in leakage in the turbine condenser. Additional dose rate surveys will be taken at the 60% and 100% power levels.

All data thus far has been within the specifications provided in FSAR Chapter 12 and the design specifications. One anomalous reading from the roof of the TIP room was under investigation. All data is reviewed by HP supervision as well as the contractor in charge of startup testing (GE). The inspector had no further questions.

4.0 Locked High Radiation Areas

The inspector reviewed the licensee's program to identify and control high radiation areas during Unit 2 power ascension as required by Technical Specification 6.12 "High Radiation Area" and 10 CFR 20.203 "Caution signs, labels, signals and controls." Within the scope of this review no violations were observed. The licensee assigned full responsibility to identify areas to be controlled and to update the list to one radiological engineer. He is also responsible to ensure that barriers, locking mechanisms and warning signs are adequate. The inspector determined that the list of areas for Unit 2 is adequate. All locked plant areas (≥ 1000 mrem/hr) are checked daily by HP technicians in accordance with Surveillance Test ST-0-104-642-0 "Locked High Radiation Area Checks". The resulting logs are reviewed by a Senior HP technician and the radiological engineer. Discrepancies are immediately reported to HP and Plant Operations supervision. The inspector reviewed selected records and toured the locked areas and verified that the controls have been properly implemented. A licensee strength was noted in that areas with dose rates at ≥ 100 mrem/hr are also locked. Areas anticipated to reach these levels are also locked. Similar controls are used except these areas are designated as "level 1" while areas ≥ 1000 mrem/hr are designated as "level 2".

5.0 Coordination of Startup Activities

The inspector reviewed the management control of startup testing, changing radiological conditions and unanticipated repairs of equipment. The control was evaluated by observation of a three day plan of the day (TRIPOD) meeting, a shift superintendents meeting, and work on the turbine waterbox in the condenser bay. Within the scope of this review the inspector determined that the controls are good.

6.0 Shipment of an Intermediate Range Monitor

The Intermediate Range Monitors are small fission chambers used to measure in-core neutron flux during reactor startups. On September 8, 1989 the licensee shipped three unused detectors back to the manufacturer (Reuter-Stokes) after they failed electrical checks performed in the warehouse. In accordance with Procedure SDI-I "Storage Division Implementing Procedure for Receipt and Shipment of Radioactive Materials", the warehouse personnel contacted the Reactor Engineering Department for fissile material accountability and the Health Physics Department. A HP technician surveyed the package and attached a radioactive materials sticker similar to those used in-plant. On arrival at the freight terminal, the dispatcher questioned the meaning of the label. The licensee sent the radwaste shipping coordinator, a QC inspector, and a HP technician to the terminal to investigate. The team determined that the package did not require labeling. However, the shipment was upgraded to "limited quantity", the proper label was attached and the shipping papers revised.

The inspector interviewed selected personnel including a manufacturing representative and reviewed the results of the licensee's investigation. Conclusions are as follows:

1) The IRM are normally shipped as "instruments and articles" and are exempted from most requirements of 40 CFR 173, because they involve small quantities of uranium. Marking and labeling of the package is not required.

2) There was no hazard to public health or safety.

3) The Radwaste Department personnel, who were recently given responsibility for classification and control of radioactive materials shipments, were not contacted.

4) Response to this event was prompt and conservative.

The licensee determined that the root cause of the improper labeling was a failure to notify the Radwaste Department of the shipment due to out of date procedures. The warehouse procedures for control of radioactive material were last revised in 1985. A reorganization last year transferred responsibility for shipments to the Radwaste Department from the Health Physics Department. Warehouse procedures are under revision to reflect the reorganization but warehouse SDI-1 procedures for control of radioactive material had not been changed yet. The licensee stated that this will be corrected. This matter will be reviewed in a future inspection.

7.0 TIP Room Radiation Monitors

The licensee changed the Unit 2 Traversing In-Core Probes to new gamma detectors. The vendor stated that the new probes would become activated

to a higher level but that dose rates would decay very quickly. The experience on Unit 2 appears to conflict with these projections. Normally, the TIPs decay to a level below the room Area Radiation Monitor (ARM) in 24 hours. However, the new "gamma" TIPs caused the ARM to alarm for at least two days.

The ARM system installed at Limerick does not have reflash capability. If any of the 19 channels alarms, the remaining channels are locked out. This problem was recognized on Unit 1 and resulted in proposed corrective actions. However, the matter was unresolved. The situation on Unit 2 is further aggravated by the behavior of the gamma TIPs.

An evaluation by HP personnel indicated the new TIPs created a dose rate in the TIP Room that is more than 10 times higher while the decay rate was only slightly greater than for Unit 1. Accurate measurements were not possible since the TIP Room ARM was off scale high (>8,000 mr/hr) for the first 5 hours after TIP withdrawl from the reactor core.

The licensee stated that the radiological impact of continued use of the gamma TIP will be reviewed and corrective measures to prevent lock-up of the ARM system will be taken. These matters will be reviewed in a future inspection.

8.0 Worker Heat Stress

On August 29, 1989 two contractor workers and an HP technician became ill due to heat stress. All three personnel were involved in cleaning Control Rod Drive (CRD) mechanisms in the Unit 1 CRD Flush Room. The work required the use of respirators, double protective clothing and a plastic suit.

The inspector reviewed the circumstances of this event by interviews with HP and Safety Department personnel and an inspection of the area. A noncompliance relative to this event is cited in the resident inspectors report for this period. It was determined that the licensee was aware of the potential for heat stress and had designed the room with a self-contained air conditioner. The design was intended to maintain the room at 65°F to compensate for the use of extensive personnel protective equipment. However, the air conditioner had been out of service for some time. The HP technicians controlling work in the room were not aware of the heat stress caused by the protective clothing.

The inspector noted that several incidents of heat stress had previously occurred at Limerick under similar circumstances. The licensee stated that improved coordination between radiological protection and industrial safety departments will be implemented. Licensee action will be reviewed in a future inspection.

## 9.0 Exit Interview

The inspector met with the personnel denoted in Section 1 at the conclusion of the inspection on September 15, 1989 to present the scope and findings of the inspection.