U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-352/86-02

Docket No. 50-352

License No. NPF-39 Priority -- Category C

Licensee: Philadelphia Electric Company
2301 Market Street
Philadelphia, PA 19101

Facility Name: Limerick Generating Station, Unit 1

Inspection At: Limerick, PA

Inspection Conducted: January 6-10, 1986

Inspectors: T. Dragoun, Radiation Specialist — date: Feb 4 1986

M. Miller, Radiation Specialist — date: 2/4/86

J. Kottan, Senior Radiation Specialist — date: 2/4/86

Approved by: M. Shanbaky, Chief, Facilities Radiation Protection Section — date: 2/4/86

Inspection Summary: Inspection on January 6-10, 1986 (Report No. 50-352/86-02)

Areas Inspected: Routine unannounced safety inspection of the licensee's radiation protection program including: organization and staffing; evaluation of a gaseous effluent release; actions taken for a steam leak in the condenser bay; routine radiological surveys; health physics technician training; radiation work permits; and the start-up test program. The inspection involved 68 inspector hours onsite by three region-based inspectors.

Results: No violations were identified.

DETAILS

1.0 Persons Contacted

1.1 Licensee Personnel

G. Leitch, Plant Manager
J. Spencer, Superintendent - Plant Services
R. Dubiel, Senior Health Physicist
J. Wiley, Senior Chemist
C. Endiss, Regulatory Engineer
J. Fongheiser, Radiation Protection Physicist
C. Harmon, Quality Assurance Engineer
G. Murphy, Technical Support HP
J. Rubert, Site Supervisor, EPQA
R. Titolo, Applied Health Physicist
V. Warren, Test Engineer

1.2 NRC Personnel

E. Kelley, Resident Inspector

All personnel listed above attended the exit interview on January 10, 1986.

Other licensee or contractor employees were also contacted or interviewed during this inspection.

2.0 Purpose

The purpose of this routine inspection was to review the licensee's radiation protection program with respect to the following elements:

- Status of previously identified items
- Organization and staffing
- Evaluation of a gaseous effluent release
- Steam leak action
- Routine radiological surveys
- Health Physics technician training
- Radiation work permits
- Startup test program
- Radioactive spill

3.0 Status of Previously Identified Items

3.1 (Open) Inspector Follow-up Item (352/84-66-06):

Collect and isotopically analyze PASS samples when sufficient activity levels are present. The licensee sampled the "A" RHR pathway from the PASS for a comparison with the Normal Sample Station. The inspector noted the comparison was conducted four times between 50 to 69 percent power level. The licensee stated that the PASS sample loops decreased the concentration differences from a factor of twenty-five to a factor of two. The licensee stated that continued sample comparisons to confirm that the PASS and normal sampling capabilities are within a factor of two will be performed. The inspector stated this action would be reviewed during a future inspection when radioactivity levels are sufficiently high to reduce analytical uncertainties.

4.0 Organization and Staffing

The organization and staffing of the health physics function was reviewed against criteria contained in:

- Technical Specification 6.2 - Organization
- Technical Specification 6.3 - Unit Staff Qualifications
- ANSI/ANS 3.1 - 1978, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants"
- Reg Guide 1.8, "Personnel Selection and Training"
- ANSI/ANS 3.1 - 1978, "Administrative Control and Quality Assurance for the Operational Phase of Nuclear Power Plants."

The licensees performance relative to these criteria was determined from discussions with the Senior Health Physicist, and a review of position descriptions and personnel resumes.

The licensee has created two new superintendent positions. The Superintendent - Services is now responsible for three departments: Maintenance, Health Physics, and Outage Planning. Within the Health Physics Department, the ALARA Physicist has been moved under the Applied Health Physics section in order to balance the work load of the line supervisors. The licensee stated that these changes have been discussed with NRR and were made in an effort to enhance the various programs through increased management oversight.

Within the scope of this review, no violation was observed.

5.0 Gaseous Effluent Release

The licensees action with respect to a minor and unexpected release of gaseous effluent was reviewed against criteria contained in:

- Technical Specification 3/4.11.2 "Gaseous Effluents"
- Technical Specification 4.11.2.6.1 and 4.11.2.6.2 "Radioactive Effluents; Main Condenser"
- Station Procedure ST-6-104-880-0 "Gaseous Effluent Dose Rate Determination"
- Station Procedure EP-315 "Calculation of Offsite Doses During a (Potential) Radiological Emergency Using RMMS in the Manual Mode"

The action taken was determined by: interviews with the Support Health Physicist, Special Projects HP, Chemistry Supervisor, Count Room Chemist, and cognizant Test Engineer; a review of dose calculations; and a review of the operation of the RMMS monitoring system.

On January 2, 1986 during a controlled shutdown of the plant an in-rush of air into the turbine condenser occurred apparently as a result of cracked bellows in the cross-around piping. This air inleakage was pumped into the off gas system causing a pressure surge. The surge blew out a water seal in the radiation monitoring system and opened up a direct vent path through 1/2 inch sample piping to the north exhaust stack. The licensee's preliminary data indicates that the gaseous release rate in the stack peaked at 178.6 µCi per second and lasted less than 45 minutes. The technical specification limits for the release were not exceeded.

The licensee stated that the loop seal design will be evaluated to prevent a recurrence and that operations personnel were briefed regarding the problems that occurred. The chemistry technicians reported some delay in obtaining a grab sample for analysis due to locked security doors at the access to the north stack sample station. The licensee stated that the security controls to this area will be revised to allow expedited access for the technicians. This matter will be reviewed in a future inspection. (86-02-01)

6.0 Condenser Bay Steam Leak

After testing and instrumentation adjustments the plant was started and brought to full power on about December 28, 1985. The operators noted a steam flow versus power output mismatch indicating a loss of about 300,000 lbs/hr of the steam flow. On about January 2, 1986 it was determined that a steam relief valve on the cross-around piping was failed open and dumping low pressure steam into the condensers. At this time leaks developed from cracks in the expansion bellows used at the relief pipe ends, releasing

steam into the condenser bay area. The steam condensed on the cold walls of the building with a small amount, estimated as less than 100 gallons permeating to the outside wall. The radioactivity in the condensed steam was measured by the licensee and found to be predominately N^{13} and F^{18}.

The concentration of the F^{18} activity was 4×10^{-4} µCi/ml which is half of the limit for water provided in 10 CFR 20 Appendix B. The licensee concluded that there was no radiological hazards to personnel as a result of the steam leak. The low level radioactivity quickly dissipated due to the short half lives of the isotopes involved.

Within the scope of this review, no violations were observed. However, the inspector noted that the licensee does not have a procedure to capture the facts relative to potential radiological incidents and provide for a timely management review of these incidents. The licensee stated that there is ongoing management review of all significant events and that a procedure for documenting the events will be issued in February 1986. This matter will be reviewed in a future inspection . (86-02-02)

7.0 Routine Radiological Surveys

The licensees program for the conduct of routine radiological surveys was reviewed against criteria contained in:

- Technical Specifications 6.11, "Radiation Protection Program"
- 10 CFR 20 '05, "Permissible Levels of Radiation in Unrestricted Area"
- 10 CFR 20.201, "Surveys"
- 10 CFR 20.203, "Caution signs, labels, signals and controls"
- 10 CFR 20.206, "Instruction of personnel"
- 10 CFR 20.401, "Records of surveys, radiation monitoring and disposal"
- Regulatory Guide 8.2, "Guide for Administrative Practices in Radiation Monitoring"
- IE Notice 84-82: Guidance for Posting Radiation Areas
- Station Procedures HP200, HP210, HP211, HP213, and HP215

The licensee's performance relative to these criteria was determined by:

- Discussion with the Health Physics Supervisor, Applied Health Physicist, and HP technicians,

- A review of completed radiation surveys and survey schedules,
- Observation of postings in selected plant areas,
- A review of the qualifications of technician performing the surveys.

Within the scope of this review, no violations were observed. In a few instances, the licensee has used only a three bladed magenta on yellow radiation symbol with no added wording posted on the door to a locked room. Technicians stated that this was done whenever the radiological conditions were expected to change. At the time of inspection these areas did not constitute Radiation or high Radiation Areas. The license was advised that IE Notice 84-82 states that postings should provide adequate information to workers to allow exposures to be minimized. The licensee stated that in the future all signs will follow generally accepted industry practice and regulatory requirements. In addition, permanent signs will be used whenever practicable. This matter will be reviewed in a future inspection. (86-02-03)

8.0 Health Physics Technician Training

The training and qualification program for Health Physics technician was reviewed against criteria contained in:

- Technical Specification 6.3, "Unit Staff Qualifications"
- Technical Specification 6.4, "Training"
- Technical Specification 6.10.3, "Record Retention"
- ANSI/ANS 3.1-1978, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants"
- Station Procedure HP-100, "Health Physics Technician Selection, Training and Qualification"

The status of the licensees program was determined by:

- Interviews with the site and corporate Training Coordinators,
- Review of the "Nuclear Training Catalog", schedules, lesson plans and tests,
- Review of instructor training manuals and certifications,
- Review of selected qualification folders.

The licensee's training and qualification program for HP technicians is in various stages of development. The material for the Assistant Technician (AT), which is the first of six levels of progression, has been completed in draft form. The lesson plans and tests for the remaining levels in the stepwise qualification process will be developed as required. The licensee is coordinating this program with the Peach Bottom station.

Within the scope of this review, no violations were observed. The inspector noted examples of licensee strengths in this program. The lesson plans for AT level training were particularly thorough and technically sound. In addition, the licensee has tested the senior level qualified technicians hired at Peach Bottom, determined areas of weakness, and established a remedial training program for these technicians. The licensee indicted that INPO accreditation for the training courses is being sought.

9.0 Radiation Work Permits

The licensees implementation of procedure HP-310 "Radiation Work Permits" was reviewed by discussions with the Health Physics Supervisor, accompanying technicians during a pre-job survey, and an inspection of records. There was no work in progress that required an RWP. The licensee stated that all work, including work by any contractor, is assigned a Maintenance Request (MRF) number. A computer is then used to record all important information regarding any work, including the requirement for an RWP. This system was adopted, with some modification, from the Peach Bottom station. The inspector concluded that the MRF system can provide adequate control of work. However, the low levels of plant contamination at the present time do not require frequent use of RWP's. This area will be reviewed again in a future inspection.

10.0 Start-up Tests: Chemical and Radiochemical

The inspector reviewed licensee Start-up Test results for chemical and radiochemical tests and gaseous radioactive waste system tests. The following specific Start-up Tests were reviewed: STP 1.2, Power Ascension Chemistry/Radiochemistry; STP 1.3, Gaseous Effluents; and STP 34.1, Offgas Performance. The Start-up Test results were reviewed against the acceptance criteria contained in the Start-up Test procedures.

The Start-up Tests results review indicated that the licensee established reactor water quality parameters that met the Technical Specification requirements, and demonstrated the ability to maintain the specifications during operation up to 80% reactor power. Also, the Start-up Test results indicated that the offgas system, which had been tested through the 100% reactor power level met the performance specifications stated in the FSAR, and gaseous radioactive effluent releases were within Technical Specification limits.

The inspector noted that Start-up Test 34.1, Offgas Performance, performed at both the 65-80 percent power levels, and the 90-100 percent power levels contained both arithmetical and transcription errors. These results had not been reviewed and approved. These errors were discussed with license and licensee contractor personnel. In addition, Start-up Test 1.3, Gaseous Effluents, performed at the 45-55% power level contained an error, in that the improper plant vent monitor reading was recorded in Appendix A of the test. This test, however, was reviewed by PORC and approved. The licensee stated that all three tests would be corrected. The inspectors noted that with the necessary corrections the tests still met all acceptance criteria. The inspector stated that the corrections would be reviewed during a subsequent inspection. (352/86-02-04)

The inspector also witnessed a demonstration of the licensee's computer system for maintaining and trending chemistry data. This system was examined during a previous inspection (50-352/85-23 conducted April 23-26, 1985) of this area but at that time the system was in the development stages. During this demonstration, graphs of various chemical parameter versus time were shown to the inspector as well as the actual data files. Although the system is not completely implemented, it appears that the licensee has developed a chemistry data base system which will contribute to the licensee's ability to meet plant system chemistry parameters.

The inspector had no further questions in this area. No violations were identified.

Start-up Testing: Radiation Surveys

Documents Reviewed

- Final Safety Analysis Report (FSAR), Chapter 14, "Initial Test Program"
- Start-up Test Procedure STP 2.0, Revision 1. "Radiation Measurements -Main Body", dated September 13, 1984
- Start-up Test Procedure STP 2.1-6, Revision 1, "Start-up Radiation Surveys-Prior to Fuel Load", dated December 27, 1985
- ANSI/ANS-6.3.1, 1980, "Program for Testing Radiation Shields in Light Water Reactors (LWR)"

Review of the test procedures and test data indicated that the licensee was conducting start-up radiation surveys in accordance with FSAR commitments and procedural requirements. There were no unexpected levels of radiation except for one location. This reading was 34 mr/hr (Zone III). The licensee plans on resolving this test result by redesignating the area as a Zone II. The licensee PORC review of the test results was not completed.

11.0 Radioactive Spill

The inspector discussed a spill which occurred at the condensate sampling station on January 8, 1986. The drain lines from the sample sink at this sampling station became inoperable when the plant was shut down and drain line vacuum was lost. The sample sink overflowed into a floor drain which was pumped to the onsite holding pond. The holding pond is discharged to the Schuylkill River. Analysis of the liquid in the sample sink indicated only Co-58 at a concentration of 4.03 E-6 µCi/ml. This concentration was less than the unrestricted area MPC of 9 E-5 µCi/ml for Co-58 prior to dilution in the holding pond. A sample of the holding pond indicated less than detectable levels of Co-58. The licensee stated that evaluations were being performed in order to ensure operation of the sample station drain lines when vacuum was lost. The inspector stated that this area would be reviewed during a subsequent inspection. (352/86-02-05)

The inspector had no further questions in this area. No violations were identified.

12.0 Exit Interview

The inspector met with licensee representatives at the conclusion of the inspection on January 10, 1986. The scope and findings of the inspection were discussed at that time. At no time was written material provided to the licensee by the NRC inspector.