UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-250/79-40 and 50-251/79-40

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, Florida

Facility Name: Turkey Point Units 3 and 4

Docket Nos. 50-250 and 50-251

License Nos. DPR-31 and DPR-31

Inspection at Turkey Point site near Homestead, Florida

Inspector: A F Gib Feb 1, 1980
for J. R. Wray Date Signed

Approved by: A F Gib Feb 1, 1980
A. F. Gibson Date Signed

Areas Inspected

This special unannounced inspection involved 27 inspector-hours on site in the area of review of events surrounding the overexposure of a contract worker.

Results

Three apparent items of noncompliance were found in the one area inspected (Infraction - Exceeded quarterly whole body radiation exposure limit (50-250/251/79-40-01), paragraph 5; Infraction - Failure to have a procedure (50-250/251/79-40-02), paragraph 6.a; Infraction - Failure to follow procedures (50-250/251/79-40-03), paragraph 6.b).

DETAILS

1. Persons Contacted

Licensee Employees

*H. E. Yaeger, Site Manager
*J. K. Hays, Plant Manager - Nuclear
*S. M. Feith, Senior Quality Assurance Engineer
*T. Essinger, Assistant Manager - QA Operations
*G. M. Vaux, Q. C. Supervisor (Acting)
*H. F. Storey, Corporate Health Physicist
*P.W. Hughes, Health Physics Supervisor
*T. S. Peck, Health Physics
*J. R. Bates, Jr., Health Physics
J. Olsonowski, Maintenance Supervisor
N. LeGate, Construction Supervisor
R. Brown, Health Physics Shift Supervisor
R. Otey, Health Physics Technician
J. Danek, Health Physics

Other licensee employees contacted included ten construction craftsmen, four technicians and three office personnel.

Other Organizations

Westinghouse

M. Lehr, Division Manager
P. Brennan, Site Coordinator
L. Raymond, Engineer

NRC Resident Inspector

R. Vogt-Lowell

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 20, 1979, with those persons indicated in Paragraph 1 above. The plant manager acknowledged the items of noncompliance and stated that the station had revised their health physics coverage policy for platform work beneath the steam generators. In the future, two health physics personnel will cover all platform work beneath the steam generators, with more emphasis placed upon worker exposure control. The inspector discussed the factors listed in paragraph 6.b which are believed to have contributed to the overexposure.

3. Licensee Action on Previous Inspection Findings

Not Inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Overexposure Incident

At approximately 4:00 p.m. on December 11, 1979, a contract worker entered the Unit No. 3 Containment Building on Radiation Work Permit (RWP) 79-681 to complete tube marking of Steam Generator "B". A bubble suit with supplied air was donned at the platform with the aid of the health physics techician assigned to the job. Two 0-1 R pocket dosimeters and a TLD were taped to the worker's cap inside the bubble hood. The health physics technician questioned the anticipated activities while on the platform. The worker informed the health physics technician that he would be completing the job of marking the defective tubes he and his supervisor had begun that morning. The worker had received 690 mrem, by pocket dosimeter, in one hour and 50 minutes for that work. After reviewing the radiation survey data attached to the RWP, the technician calculated the worker's exposure would not exceed his administrative quarterly limit of 2150 mrem by 6:00 p.m., at which time he was to be relieved. The survey showed dose rates of about 500 mrem/ hour at three feet from the opened steam generator manway, 1800 mrem/hr at one foot from the manway, 5000 - 10000 mrem/hr just inside the channel head, and 10-15 mrem/hr where the health physics technician would station himself to cover the job.

Between 4:45 p.m. and 5:45 p.m., the health physics technician's attention was diverted twice by questions from other contract workers working in the containment. In addition, two trips away from his duty station were made by the technician to telephone the health physics control point outside the containment building. The health physics technician estimated that approximately 25 to 35 minutes were spent answering general health physics related questions by concerned workers and calling the control point. No health physics coverage of the job was provided during this time as required by the RWP.

When the health physics technician noticed the worker about to place his head inside the steam generator hot leg manway, he immediately stopped the the contract worker and called him off the platform. His two 0-1 R pocket dosimeters were read at this time. Both were off scale. The job was terminated and both men left the containment. The worker's TLD was taken to be analyzed. Since there is no onsite TLD read-out capability and the Health Physics staff, at that time, did not expect an excessive dose, the decision was made to wait until the next morning to send the dosimeter to the corporate office. The inspector's investigation revealed that ten separate manway entries were made by the worker to mark the cold leg section of steam generator 3.B.

On the morning of December 12, 1979, the corporate Health Physics Department notified the site that the TLD read 3.55 rems. 10 CFR 20.101(b)(1) requires that the dose to the whole body of any individual in a restricted area shall not exceed three rems per calender quarter. Subsequently, the inspector informed the licensee at the exit interview that the exposure of a contract worker to 3.55 rems, as indicated by TLD, was in noncompliance with 10 CFR 20.101(b)(1) (50-250/251/79-40-01).

6. Pre-incident Activities

a. Operational

More experienced eddy current and explosive plugging personnel on site had already accumulated relatively high quarterly exposures. Consequently, the subcontractor responsible for inspection and plugging of defective steam generator tubes brought in a qualified but less experienced worker from its corporate office with zero quarterly exposure. The worker was to perform the relatively simple task of steam generator tube marking.

The individual arrived on site December 10, 1979. He had a whole body count, was respirator fitted, and completed an NRC-4 form. Since he had prior nuclear power plant work experience, the requirement to attend two days of training prior to being granted unescorted assess inside the Radiation Control Area (RCA) was waived as permitted by procedure. He satisfactorily completed a written examination and was issued a red badge.

On the morning of December 11, 1979, the worker reported to his supervisor, who was also the site coordinator for his company. He spent approximately 45 minutes with his supervisor training on the steam generator mock-up. The supervisor instructed the worker in what work was to be done and demonstrated how the work was to be done. He reviewed photographs of the tube sheet indicating those tubes which needed to be marked. He was shown the techniques for using the long (12-18 ft.) and short (4 ft) marking tools. The long tool is used to mark tubes that can be reached from outside the manway; the short tool is used to mark tubes above the manway which are visible only after entering the manway. The effectiveness of the mock-up training was limited because a model of the correct plug pattern for steam generator 3 B was not available.

No special or specific health physics instructions concerning channel head entry were given. No representative of the health physics staff was present during this training. No written procedure for marking defective steam generator tubes had been established. Technical Specification 6.8.1 states in part that written procedures and administrative policies shall be established, implemented and maintained. The inspector informed the licensee that failure to have a procedure for the marking of defective steam generator tubes is in noncompliance with Technical Specification 6.8.1. (50-250/251/79-40-01)

At approximately 11:30 a.m. the contract worker and his supervisor entered the unit No. 3 containment building and began work on the cold leg of steam generator B. Thirty tubes were marked with the long tool in one hour and 50 minutes. The marker received 690mrem. The supervisor was satisfied that sufficient mock-up and on-the-job training had been provided. He instructed his worker to complete the marking job by himself that afternoon. The worker entered containment at approximately 4:00 p.m. as stated in paragraph 5.

b. Health Physics

Steam generator tube marking work had just begun for this outage. Historically, the health physics coverage had been one health physics technician providing continuous surveillance for the tube marking work. The inspector was informed that the contract workers rely totally upon the licensee's health physics staff to provide health physics expertise during the actual tube marking work.

Just before 4:00 p.m. on December 11, the Health Physics Shift Supervisor selected a health physics technician to cover tube marking of steam generator 3B. The technician was selected because of his prior experience in covering tube marking operations, however, the technician had not provided health physics coverage for a tube marking job in approximately a year. His work assignments for this outage had been limited to the Auxiliary Building. He received no briefing on changes in containment building conditions prior to entering containment, although some changes affecting health physics coverage had occurred since he was last assigned this type job.

(1) Bubble suits with supplied air were now being used for the actual tube marking work. The health physics technician did not know where to place the worker's dosimeters and had to question the worker. The two pocket dosimeters and the licensee issued TLD were taped inside the bubble hood making reading of the pocket dosimeter difficult. The worker's company film badge was taped inside the suit at chest level.

(2) Health physics personnel inside containment were wearing color coded hoods for easier recognition by contract workers. Much of the technician's time was spent responding to other worker's concerns since he was readily identified as a health physics technician.

The health physics technician relied totally on the worker for information concerning the expected activities of the worker during tube marking. The technician expected no channel head entries because the worker had told him he would only be completing work started that morning in which he received 690 mrem in less than two hours. The technician did not know that channel head entries would be necessary and thus did not compute stay times nor implement other controls appropriate for such entries.

Prior to the start of work, a survey was performed. Radiation levels as stated in paragraph 5., were recorded. No beta survey was performed. Past steam generator work had shown zero beta exposure as reported by TLD (sensitive to 80 kev betas). Note: Zero beta exposure was reported for the overexposed contract worker.

Air samples are continuously taken during the period of time a worker is on the platform beneath a steam generator. A special sample is taken for all entries into the steam generator. The inspector reviewed the results of air sample data and noted that a platform air sample was taken for the period of interest. However, no channel head air sample was performed.

The health physics technician's activities while inside the containment building are described in paragraph 5. Included is an estimated 25 to 35-minute period during which tube marking activities were being performed on the steam generator platform with no health physics coverage.

Technical Specification 6.8.1 states in part that written procedures and administrative policies shall be established, implemented and maintained. Operating Procedure 11550.2, Section 4.19 states in part that all plant personnel are responsible for abiding by any applicable Radiation Work Permit Instructions. Radiation Work Permit 79-681 states that health physics coverage is required for steam generator entry and platform work. Further instructions include requirements to determine particulate and iodine air activity routinely as job progresses.

Contrary to the above, ten separate steam generator channel head entries were made by a worker to mark defective tubes in the cold leg section of steam generator 3B without health physics coverage. In addition, although a continuous air sample was taken on the platform, no channel head air sample was performed during the tube marking job. The licensee was informed that failure to follow the requirements of RWP 79-681 is in noncompliance with Technical Specification 6.8.1 (50-250/251/79-40-01).

The inspector concluded that inadequate preparation for marking defective steam generator tubes contributed to the overexposure of the contract worker. The inspector discussed with the licensee representatives at the exit interview the need for better communications between all parties involved. The discussion included the following possible corrective actions:

(1) Better health physics training of the marker

(2) Briefing of health physics technicians on marker's activities

(3) More efficient use of mock-up by marker and health physics

(4) Issuance of specific RWP for tube marking job with special instructions addressing stay time calculations and other appropriate exposure controls

(5) Use of equipment to eliminate or reduce the time consuming process of locating defective tubes to be marked by counted rows and columns.

   (a) Use of template
   (b) Use of eddy current test machine

7. Post-incident Activities

The worker was immediately restricted from the RCA when his two 0-1 R pocket dosimeters read off scale. All steam generator work was stopped when the over exposure was confirmed. The worker has not been allowed back inside the RCA. Steam generator platform work was permitted to resume following a licensee investigation and the following health physics policy change: Health Physics coverage for future steam generator tube marking jobs will consist of two health physics technicians so that all workers on the platform will be in view by at least one technician at all times. Radiation Work Permits will be generated specifically for the marking job with more specific health physics instructions. The inspector had no further comments.

8. Similar Activities

The inspector made two separate entries into the containment building and interviewed several craftsmen to determine if workers were aware of radiation levels in their work area, RWP number and requirements, and to determine the general attitude toward health physics. No problems or deficiencies in training or attitudes were encountered.