



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-250/83-37 and 50-251/83-37

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, FL 33101

Docket Nos.: 50-250 and 50-251

License Nos.: DPR-31 and DPR-41

Facility Name: Turkey Point 3 and 4

Inspection at Turkey Point site near Homestead, Florida

Inspectors:	<u>C. M. Hosey</u>	<u>12/1/83</u>
	C. M. Hosey	Date Signed
	<u>R. E. Weddington</u>	<u>12/1/83</u>
	R. E. Weddington	Date Signed
Approved by:	<u>K. P. Barr</u>	<u>12/2/83</u>
	K. P. Barr, Section Chief	Date Signed
	Operational Program Branch	
	Division of Engineering and Operational Programs	

SUMMARY

Inspection on October 18-21, 1983

Areas Inspected

This routine, unannounced inspection involved 66 inspector-hours on site in the areas of radiological controls associated with the Unit 3 refueling outage including external exposure control, internal exposure control, posting, labeling and control, surveys, qualifications of contract HP technicians, entry into the containment sump, spent fuel pit demineralizer resin transfer, followup on unplanned gaseous radioactivity releases and followup on previous inspector identified items.

Results

Of the 9 areas inspected, no violations or deviations were identified in 7 areas; one apparent violation was found in each of 2 areas (Failure to follow technical specifications and failure to have an approved procedure).

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

J. K. Hays, Plant Manager, Nuclear
*P. W. Hughes, Health Physics Supervisor
J. S. Wade, Jr., Chemistry Supervisor
E. R. Lapierre, Radiochemist
*R. M. Brown, Health Physics Operations Supervisor
*J. R. Bates, Health Physics ALARA Supervisor
J. H. Hopkins, Radwaste Supervisor
*T. A. Coleman, Health Physics Administrative Supervisor
A. E. Byrnes, Auxiliary Building Supervisor
P. R. Lanning, Plant Supervisor-Nuclear
J. E. Crockford, Plant Supervisor-Nuclear
D. E. Cooper, Health Physics Shift Supervisor

Other licensee employees contacted included five construction craftsmen, eight technicians, two operators, five mechanics and three office personnel.

NRC Resident Inspectors

R. Vogt-Lowell, Senior Resident Inspector
D. Brewer, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on October 21, 1983, with those persons indicated in paragraph 1 above. The inspector informed the licensee that failure to perform a survey to determine the radiological hazards present in the reactor sump (reactor cavity) prior to permitting personnel access and failure to have an approved procedure for transferring resin from the Unit 4 spent fuel pit demineralizer to a temporary collection facility would be considered apparent violations of 10 CFR 20.201(b) and Technical Specification 6.8, respectively. Plant management acknowledged the violations.

An Enforcement Conference was held on November 9, 1983, in the Region II office in Atlanta, Georgia. Mr. J. W. Williams, Vice President Nuclear Energy and other members of the FP&L staff met with Mr. R. C. Lewis and other members of the Region II staff. NRC representatives reviewed the entry of the workers into the reactor sump with the licensee. Florida Power and Light representatives discussed the findings and provided specific actions which would be taken to prevent a recurrence. During this meeting the NRC representatives indicated the apparent cause of the event was

failure of FP&L to establish appropriate controls, including a procedural requirement for RWP use by workers entering into such areas and administrative control of keys, both of which should have ensured management involvement in the decision to enter this potentially hazardous area.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Followup on Previous Inspector Identified Items (IFI)

- a. (Closed) IFI (83-20-03) Revise Emergency Procedure. This item concerned the revision of Emergency Procedure 20001 (E-1), Loss of Reactor Coolant, to eliminate the verification of valve position after initiation of recirculation. Dose rates in the area of the valves are expected to range from 5,000 to 50,000 r/hr after initiation of recirculation following a loss of reactor coolant accident. The inspector reviewed the revised procedure approved by the plant manager on September 22, 1983. The inspector noted that the appropriate changes had been made and had no further questions.
- b. (Closed) IFI (83-31-02) Refresher Training for Health Physics Technicians. This item concerned the establishment of a formalized refresher training program for health physics personnel that met the intent of plant procedure HP-81. The item also addressed training all plant radiation protection personnel who might serve on an emergency radiation team, in the specific procedure for collecting and analyzing air samples using portable analysis equipment. The inspector reviewed the training schedule for the remainder of 1983 and lesson plans and attendance sheets for a training session for all permanent plant health physics technicians/radiation protection personnel in the collection and analysis of air samples during emergencies. The actions taken by the licensee to formalize the training program and to meet the intent of the plant procedure have been appropriate.

6. Qualifications

Technical Specification 6.3.1 requires that each member of the facility staff meet or exceed the minimum qualifications of ANSI N18.1-1971 for comparable positions. Paragraph 4 of ANSI N18.1 states, in part, that technicians in responsible positions shall have a minimum of two years of working experience in their specialty. The inspector selectively reviewed the experience of senior contract health physics technicians. During the current outage, the licensee augmented the permanent HP staff with 142 contract technicians. In addition, the inspectors reviewed the results of a written examination covering radiological protection fundamentals given to contract technicians. No violations or deviations were identified.

7. External Exposure Control

During tours of the plant, the inspector observed workers wearing personnel monitoring devices (pocket dosimeter and/or TLD). The inspectors discussed the dose monitoring program with licensee representatives. The inspectors also reviewed computer printouts for several plant departments and verified that the radiation dose recorded for 1983 appeared to be well within NRC limits. The licensee was maintaining the records of radiation exposure required by 10 CFR 20.401. The inspector reviewed data collected by the licensee while multi-badging personnel during the current Unit 3 outage. The licensee is performing extensive multi-badging (3-8 whole body TLD per individual) to evaluate the criteria they have selected and to ensure that the highest dose to any part of the whole body is recorded as the whole body dose. A licensee representative stated that considerable man-power and other resources were being expended to multi-badge personnel entering the containment to perform specific jobs in areas with highly varying radiation fields. The inspector stated that the guidance used to determine the placement of one or more whole body TLD appears to be acceptable. However, the licensee should consider evaluating the TLD information of a particular job after the first few entries by personnel wearing TLD on each of the parts whole body and determine if the number could be reduced for further entries or the feasibility of using a single TLD placed in the area of highest dose.

No violations or deviations were identified.

8. Internal Exposure Control

The inspectors selectively reviewed the results of routine air samples taken in Unit 3 containment during the current outage and also, air samples taken to support work covered by specific radiation work permits. By review of records, observations and discussions with licensee representatives, the inspectors evaluated the licensee's respiratory protection program, including engineering controls, use of respirators and MPC-hour controls.

During the early part of the outage, the licensee experienced elevated airborne radioactive iodine concentrations in Unit 3 when primary systems were vented and opened. The levels reached a high on October 2, 1983 of approximately five times the maximum permissible concentration (MPC) value specified in 10 CFR 20, Appendix B, Table I, Column 1 for soluble material. By October 9, 1983, the levels had decreased in the general areas within Unit 3 containment to twenty-five percent of MPC or less.

A review of MPC-hour records indicated that approximately 184 individuals exceeded 10 MPC-hours during the period of October 2 - 9. The maximum exposure was 29.8 MPC-hours. 10 CFR 20.103(a)(1) states that no licensee should permit an individual in a restricted area to inhale a quantity of radioactive material in any period of one calendar quarter greater than the quantity which would result from inhalation for 40 hours per week for 13 weeks at uniform concentrations of radioactive material in air specified in Appendix B, Table I, Column 1, (520 MPC-hours).

The licensee performed whole body counts for personnel who had greater than 10 MPC-hours. During a review of the whole body count results, the inspectors noted that the percent of maximum permissible organ burden (MPOB) indicated on the whole body count results data sheet was in error when compared with the actual activity measured. This was found to be true for both the chair counter and the bed counter. As an example, one individual's records indicated a thyroid burden of Iodine-131 of 14.02 nanocuries. The computer generated data sheet indicated that this activity was 10% of MPOB. The actual percent of MPOB was approximately two. A licensee representative stated that the licensee had identified several discrepancies in the computer program used with the counters, including the calculations of percent MPOB, and was working with the vendor to correct the problems. The inspector stated that this item would be reviewed during subsequent inspections. (83-37-01).

9. Surveys

The inspector selectively reviewed the results of radiation and contamination surveys performed during the current Unit 3 refueling outage. The inspectors performed independent radiation surveys in the radiation controlled area (RCA) and on secondary system components on and around the Unit 3 turbine deck and verified that the areas were properly posted. The inspector reviewed the licensee's surveys and shipping papers for the shipment of valves removed from the secondary system which had been found to have fixed contamination above the licensee's unconditional release criteria. The valves were shipped to a agreement state licensed repair facility. DOT and NRC requirements appeared to have been followed.

No violations or deviations were identified.

10. Posting, Labeling and Control

The inspector reviewed the licensee's posting and control of radiation areas, high radiation areas, airborne radioactivity areas, contamination areas, radioactive material areas and the labeling of containers of radioactive material during tours of the plant.

On several occasions, the inspectors observed personnel using improper frisking techniques when they exited the undress area outside Unit 3 containment. The improper techniques included moving the probe too fast, too far away from the area of the body being monitored and failure to monitor all areas of the body. The inspectors stated that the health physics technician assigned to the control point should point out to workers, who use improper techniques, the proper methods, thus reinforcing the proper methods. A licensee representative stated that the use of the proper frisking techniques would be required (83-37-02).

No violations or deviations were identified.

11. Unit 3 Refueling Outage

The inspector discussed with licensee representatives, the licensee's planning and preparation for the Unit 3 refueling outage, with particular attention to health physics coverage in containment, decontamination efforts, ALARA considerations, preparation of radiation work permits and direct observation of activities in containment. The licensee is continuing to provide extensive health physics technician coverage for containment. A coordinator is also assigned to containment while work is going on to direct the activities of the technicians.

No violations or deviations were identified.

12. Entry Into Reactor Sump (Reactor Cavity)

On October 18, 1983, upon arrival on site, the inspector was informed by the licensee that two workers, a shift technical advisor (STA) and a contract health physics technician had entered the Unit 3 reactor sump while the retractable thimbles were withdrawn. The licensee had informed the senior resident inspector on October 17, 1983. A licensee representative stated that the STA's TLD was sent for processing immediately, when it was determined that his self-reading pocket dosimeter was off scale. The dose received by the STA for the entry was 1300 mrem as determined by TLD. The technician's dose for the entry was 200 mrem as determined by pocket dosimeter. The inspectors discussed the entry with licensee representatives, reviewed records associated with this entry and interviewed the STA, health physics technician, health physics and operations department supervisors on duty when the entry occurred and other licensee management personnel. Based on the review of records and interviews, the inspectors determined the following sequence of events:

On October 14, 1983, at 10:45 p.m. the shift technical advisor entered the Unit 3 containment to search for the source of unidentified leakage into the reactor sump. At the time of the entry, the reactor was shut down, the reactor head was removed and the licensee was flooding the refueling cavity in preparation for refueling. The incore detectors were in the stored position and the retractable thimbles were withdrawn from the core. The STA entered containment under radiation work permit (RWP) 83-300, which was for general entries for inspections, observations and valve manipulations. Special instructions on the RWP stated, "The RWP does not authorize entry inside the Bio-wall on 14' elevation".

Independent of the STA, the contract health physics technician assigned to perform general health physics coverage in containment, was walking through containment looking for leaks. The task of performing this leak check, was received from the individual the technician relieved. The technician received the key for the sump entry door from the health physics technician he relieved. Discussion with the technician indicated that he was aware that the thimbles were withdrawn and the possibility of high radiation levels in the sump.

The STA approached the technician on the 14' elevation of containment inside the Bio wall and asked him if he had the key to the sump door. Both individuals were wearing respirators, and communications between them was limited. Both individuals observed the radiological warning signs posted on the door ("Exclusion Area, High Radiation Area, Stay-out, RWP Required For Entry"). The technician opened the door, and descended the ladder a few feet and performed a survey. Radiation levels at that point were 20-30 mr/hr. When the technician continued his descent, the STA suggested that he should go down, since he had a flashlight and a survey instrument. The technician returned to the top of the ladder. The technician stated that he changed the STA's survey instrument to the 0-500 mr/hr scale and gave it to the STA. During the descent, the STA noticed the instrument was off-scale and changed the instrument to the 0-5 r/hr scale. He then continued the descent. The technician stated that, at the time, he thought the thimbles may have been back in the core and there was no radiation problem in the reactor sump. He stated he based this conclusion on the fact that the STA appeared to be diligently checking the instrument as he descended the ladder and apparently was not encountering any unusual radiation levels. The technician followed the STA down the ladder. While the technician was descending the ladder, the STA moved from the bottom of the ladder to a position closer to the reactor vessel and the thimbles. When the technician reached the bottom of the ladder, the STA was approximately 6-8 feet away. The technician asked the STA what the instrument was reading. The STA looked at the instrument and said it was off scale. The technician immediately told the STA to leave the area, and they both ascended the ladder promptly.

The inspector stated that several factors contributed to the entry by licensee personnel into an area without knowing the radiological hazards present and which could have resulted in a potentially high radiation dose. The two individuals involved made serious errors in judgement. The STA entered the sump without knowing the status of the thimbles. In addition, descending the ladder to the bottom (line of sight with thimbles) was unnecessary since the STA could have observed water flowing into the sump from a protected position further up the ladder. The technician failed to exercise the control, he assumed when he opened the sump door. The technician abdicated his responsibility to protect the worker when he permitted the STA to enter the sump without first evaluating the radiological hazards, when his prior knowledge about entries into such areas should have prompted such an evaluation.

The inspector stated that controls for the sump were not commensurate with the hazards that were present. The door could have been opened with any high radiation area key; these keys were in the possession of most permanent plant health physics personnel. The inspector stated that the sump should have been secured with a special single key lock, with the key controlled by a single individual charged with taking specific actions prior to permitting entry. This same approach should be taken with any area where very high radiation levels are present. Although the entrance door to the sump was

posted "exclusion area" this term is not defined in plant procedures, therefore it does not provide any specific warning, nor does it elicit any particular response from workers. The technician stated that he and the STA discussed the sign's meaning prior to the entry.

Technical Specification 6.11 requires that procedures for radiation protection be prepared consistent with the requirements of 10 CFR 20 and shall be approved, maintained and adhered to for all operations involving radiation exposure. Plant procedure 11550.2 (HP-2) prohibits entry by personnel into local radiation control areas until they comply with the precautions and limitations posted at the entry to the area. The entrance to the sump was posted, "Exclusion Area, RWP Required for Entry, High Radiation Area, Stay Out." Failure of the two workers to adhere to the posted requirements is a violation of Technical Specifications (83-37-03).

Technical Specification 6-12.1 states, in part, that each high radiation area in which the intensity of radiation is greater than 100 mrem/hr shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by issuance of a radiation work permit and that individuals permitted to enter such areas shall be provided with a radiation monitoring device which continuously indicates the radiation dose rate in the area. In addition to these requirements, high radiation areas in which the intensity of radiation is greater than 1000 mr/hr are required to have locked doors and the keys maintained under administrative control. Plant procedure 11550.1 (HP-1) states that a specific RWP is required for entry into high radiation areas, and areas posted "RWP Required for Entry". The procedure also states that "Health Physics" may enter an area without an approved RWP to conduct radiological surveys. The procedure also states that upon certain occasions, the presence of health physics may be substituted for an RWP. The entrance to the reactor sump was posted at the time of entry "RWP required for Entry" and was a locked high radiation area. The inspector stated that although the entry met the requirement of the plant procedure, it violated the Technical Specifications in that the Technical Specifications required entry into the area to be controlled by an RWP. The inspector stated that, had a specific RWP been obtained prior to the entry, the shift HP supervisor and the nuclear plant supervisor would have been aware of this entry and could have insured that the radiological hazards were properly evaluated prior to this entry. The inspector stated that the plant procedure is so vague as to provide no guidance as to when a technician can be substituted for a RWP. The inspector also noted that the procedure doesn't require the technician to be controlling the work, but that he only be present, a term which is also not defined.

The technician and the STA entered the sump using an instrument which did not have sufficient range to continuously indicate the radiation dose rate in the area, as evidenced by the fact that the instrument went off-scale on its highest range, when the STA came in direct line of sight with the thimbles.

As indicated above, the technician obtained the key to the sump from the technician he relieved, however he did not remember receiving the briefing and precautions that the technician had received from the health physics supervisor. The inspector stated that passing the keys to locked high radiation area from technician to technician is not maintaining adequate administrative control necessary to prevent unauthorized entry. The inspector stated that failure of the technician and STA to have a specific RWP for entry into the sump, and to possess a radiation monitoring instrument which continuously indicated the radiation dose rate in the area and failure of the licensee to maintain administrative control over the keys would be considered apparent violation of Technical Specification 6.12 (83-37-03).

In December 1982, the NRC issued Information Notice 82-51, Overexposure in PWR Cavities. This information notice identified specific weaknesses in a plant's radiation protection program which contributed to an overexposure resulting from an entry into a reactor cavity. The notice pointed out that one of the contributing factors was a failure to have a radiation work permit which could have defined the actions, assured that precautions were identified and that proper equipment was provided. (The facility discussed also did not require an RWP if a technician provided continuous job coverage).

Licensee personnel at the plant reviewed the Information Notice in May, 1983, and considered replacing the lock in the sump door and installing a locked access grating over the entrance to the reactor sump. At that time, the licensee elected to order new locks and took no action on the request for the locked grating. On October 14, the lock cores were onsite, however they had not been installed. When the inspector toured containment on 10/19/83 the sump door lock had been changed and the key held by the plant's health physics supervisor. The request for the locked grating was submitted to engineering on October 18. The inspector stated that had the licensee's actions in response to the information notice been thorough and timely, the entry on October 14, could have been prevented.

13. Resin Transfer

During a tour of the plant on October 18, the inspectors observed a health physics shift supervisor and several health physics technicians providing coverage for work performed in the cask washdown area of Unit 4. In discussions with the supervisor and technicians it was ascertained that licensee personnel had been attempting to transfer what was thought to be clean resin from the Unit 4 spent fuel pit demineralizer to a temporary collection facility located in the cask washdown area. On the first transfer, approximately six cubic feet of resin was moved to the collection facility. The radiation level on the collection bags was approximately 15 r/hr. A licensee representative stated that new resin had been loaded into the demineralizer several months ago, however the licensee could never get satisfactory flow through the demineralizer. The operations department supervisor in charge of the transfer operation stated that a radiation

survey had been performed before the transfer and he thought the radiation readings were 80 mr/hr (background level in the vicinity of the demineralizer with clean resin) and therefore concluded that the resin had not been exposed to significant radioactivity. A review of plant records by the inspectors indicated the survey of the demineralizer was performed on August 26, 1983, approximately 2 months before the transfer was initiated. The highest radiation levels recorded on the survey was 500 mrem/hr, near the center of the demineralizer. It was noted by the inspectors that only the upper 50% of the demineralizer was surveyed. On October 19, 1983, the licensee, at the request of the inspectors resurveyed the demineralizer. This survey indicated the dose rates on the demin ranged from 800 mr/hr near the top to 4000 mr/hr near the centerline. A licensee representative stated that he thought perhaps the demin had been full of water during the August 26, survey and drained during the October 19 survey.

The task was performed with continuous health physics coverage thus, no radiation work permit (RWP) was prepared. The inspector stated that this is another example where significant health physics problems developed where continuous health physics coverage was substituted for RWP. Prior to the start of work, the health physics operations supervisor placed a hold on the work when the request for an RWP was received. However, through miscommunication, this hold was not passed along to the health physics shift supervisor.

Technical Specifications 6.8 requires that written procedures be established, implemented and maintained that meet or exceed the requirements and recommendations of Appendix A or Regulatory Guide 1.33 and that each procedure be reviewed by the plant nuclear safety committee (PNSC) and approved by the nuclear plant superintendent prior to implementation. Regulatory Guide 1.33, Appendix A, states that plants should have procedures for the control of radioactivity, including procedures for spent resin and filter sludge handling and for demineralizer resin regeneration or replacement. The inspectors determined that a hand written procedure had been used to setup and perform the first resin removal operation, and that this procedure had not been reviewed by the plant nuclear safety committee, nor approved by the plant manager nuclear prior to implementation. The inspector stated that had the procedure received PNSC review, a review of the operation by the plant health physics supervisor and other management personnel would have occurred. This management review could have ensured a better survey and overall procedure, with appropriate ALARA considerations. The inspector stated that failure to have the procedure for transferring the Unit 4 spent fuel pit demineralizer resin to a temporary collection facility reviewed by the PNSC and approved by the plant manager-nuclear was an apparent violation of plant Technical Specification 6.8 (83-37-04).

14. Unplanned Gas Releases

LERs 83-013/03L-0 and 83-014/03L-0 discussed unplanned releases to the Auxiliary Building and then to the atmosphere via the plant vent which occurred on August 16, 1983 and August 28, 1983 respectively. Investigations by the licensee found that the releases occurred during the sampling

of the Unit 3 Volume Control Tank. A drain line from the gas analyzer moisture collection system was installed without a drain line isolation valve, which permitted gases to be vented to the auxiliary building while performing gas analysis.

Review of the design deficiencies and procedural inadequacies which contributed to the releases and the licensee's corrective actions were reviewed by the resident inspector and discussed in inspection report 50-250/83-34 and 50-251/83-34. The inspectors reviewed the licensee's records and methodology for quantifying the release and found that both releases were well within the allowable release limits established by Technical Specification 3.9.2.

15. Radiological Statistics

As of November 28, 1983, the total person-rem reviewed by the plant was 1874 or 72% of the revised 1983 estimated exposure of 2620 person-rem. The estimated exposure was revised to reflect new work not anticipated when the original 1983 estimates were made.