



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

Report Nos. 50-250/81-6 and 50-251/81-6

Licensee: Florida Power and Light Company
 P. O. Box 529100
 Miami, FL 33152

Facility Name: Turkey Point 3 and 4

Docket Nos. 50-250 and 50-251

License Nos. DPR-31 and DPR-41

Inspection at Turkey Point Site, Homestead, Florida

Inspector: *D. M. Montgomery*
 for D. M. Montgomery

4/15/81
 Date Signed

Accompanying Personnel: P. C. McPhail
 Approved by: *J. Philip Stohr*
 for J. Philip Stohr, EPOS Branch Chief

4/16/81
 Date Signed

SUMMARY

Inspection on March 17-20, 1981

Areas Inspected

This routine unannounced inspection involved 45 inspector-hours on site in the areas of quality control and confirmatory measurements including; review of the laboratory quality control program, review of chemistry and radiochemistry procedures, review of quality control records and logs, and comparison of the results of split samples analyzed by the licensee and the NRC RII Mobile Laboratory.

Results

Of the four areas inspected, no items of noncompliance or deviations were identified in three areas; two violations were found in one area (failure to document and approve temporary changes to an approved procedure and failure to follow Quality Assurance procedure for calibration of M&TE).

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DETAILS

1. Persons Contacted

Licensee Employees

H. E. Yeager, Site Manager
J. Hays, Plant Manager
*J. S. Wade, Jr., Nuclear Chemistry Supervisor
*E. LaPierre, Radiochemist
*R. D. Leineke, Counting Room Supervisor
*D. W. Jone, QC Supervisor
*J. E. Moore, Operations Superintendent

Other licensee employees contacted included four technicians.

NRC Resident Inspectors

*A. Ignatonis
*W. C. Marsh

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 20, 1981 with those persons indicated in Paragraph 1 above. The licensee representative acknowledged the violations and agreed to perform the analyses referred to in paragraph 8.b. The inspector stated that a dedicated area with appropriate power was needed for the NRC Van for emergency response and routine inspections. A licensee representative agreed to provide the necessary facilities by August 1, 1981.

3. Licensee Action on Previous Inspection Findings

(Open) Infraction (250/80-08-01 and 251/80-08-01) Failure to have and follow written procedures for radiochemistry counting equipment. The inspector reviewed the procedure for efficiency calibration of the gamma spectroscopy system and liquid scintillation counter, and the daily control checks for the gas flow proportional counter. The inspector noted that corrective action for the noncompliance associated with the daily control checks had been implemented. The licensee completed corrective action as stated in their response to the item of noncompliance dated May 19, 1980; however, the inspector noted that the gamma spectroscopy calibration procedure did not have adequate detail regarding the preparation of standards for charcoal cartridges, particulate filters, and gas geometries. Licensee representatives agreed to address this area. This item will remain open until necessary procedure revisions have been completed.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. A new unresolved item identified during this inspection is discussed in paragraph 6c.

5. Laboratory Quality Control Program

The inspector reviewed the licensee's quality control program for chemical and radiochemical measurements in the following areas:

a. Assignment of Responsibility and Authority to Manage and Conduct the QC Program.

The quality control program for chemistry and radiochemistry is detailed in the plant Nuclear Chemistry procedures. The Chemistry Supervisor has been assigned the responsibility to develop and implement procedures covering all aspects of the chemistry program including quality control and testing methods. The Chemistry Supervisor also serves as the Quality Control Coordinator for the Radiochemistry Department.

b. Provisions for Audits/Inspections

Administrative Procedure 0190.73, "QC Surveillance of Nuclear Safety Related Activities" provides for quality control surveillance to assure that plant systems and components are tested, operated, controlled and maintained in accordance with requirements as specified by applicable plant procedures. The Quality Control Supervisor is responsible for scheduling, carrying out, and reviewing surveillances.

c. Methods for Assuring Deficiencies and Deviations in the Program are Recognized, Identified, and Corrected.

The Chemistry Supervisor is responsible for identifying and correcting deficiencies that are identified in the Quality Control program. The Quality Control inspectors are also responsible for ensuring that open surveillance items are resolved in a timely manner. The nuclear chemistry procedures specify various performance checks and acceptance criteria for chemistry and radiochemistry instrumentation.

6. Review of Chemistry and Radiochemistry Procedures

a. The inspector reviewed the following procedures:

- (1) NC-6, "Sample System Normal Operation", January 22, 1981.
- (2) NC-18, "LS-100 Liquid Scintillation Detector Daily Response Check," April 10, 1980.



- (3) NC-25B, "Gamma Spectrometer Efficiency Calibration for Various Geometries Using Radioactive Standards," April 10, 1980.
- (4) NC-26A, "Calibration of the ND 680/66 System," December 31, 1980.
- (5) NC-45, "Determination of Tritium Activity for Liquid Release Composites," February 11, 1977.
- (6) NC-52, "Sampling and Analyses, Preparation and Documentation of Gas Decay Tank Releases," February 11, 1977.
- (7) NC-50, "Exchange of Plant Vent and Unit 3 Spent Fuel Pit Particulate and Iodine Filter Cartridges, Analyses and Documentation of Results."

The procedure review was discussed with licensee representatives as discussed in paragraphs 6b - 6d.

- b. The inspector noted that a controlled copy of NC-52, "Sampling and Analysis, Preparation and Documentation of Gas Decay Tank Releases," was being used in the laboratory and had been changed by penciling in changes to step 4.4. This step provides instructions as to the switch position for the gas analyzer and the mode of operation (manual or automatic). The inspector was informed that this change had been made after modification of the gas analyzer, but the procedure had not been officially changed. The exact date of the unofficial procedure changes could not be determined, but licensee representatives indicated that they had been in effect for at least several months. The inspector noted that Technical Specification 6.8.3 requires that temporary changes be reviewed by two members of the plant management prior to implementation and that the Plant Superintendent and Plant Nuclear Safety Committee review the changes within fourteen days after implementation. The inspector informed licensee representatives that failure to initiate a temporary procedure change was a violation of Technical Specification 6.8.3 (250/81-06-01, 251/81-06-01). Licensee representatives acknowledged the violation and stated that the sampling procedure would have been valid with either the approved procedure or the procedure with unauthorized changes. A licensee representative informed the inspector by telephone on March 27, 1981 that temporary changes per Technical Specification 6.8.3 had been completed for the previously unauthorized changes. The inspector informed the licensee representative that formal response to the violation would still be necessary even though corrective action had been taken.
- c. The inspector noted that the flow rate for sampling radioiodine in the plant vent (NC-50) was 7.5 cfm with 2 aux fans and 1 purge fan in operation. The inspector expressed concern about the collection efficiency for radioiodine, especially organic species, at such high flow rates. Licensee representatives stated that a 50 per cent collec-



tion efficiency was used, but this factor was apparently based on studies conducted when the flow rates were lower and the collection efficiency for organic iodine had not been specifically addressed. This item shall remain unresolved pending further investigation by the licensee to determine the collection efficiency of the charcoal cartridges under current operating conditions (250/81-06-02, 251/81-06-02). Licensee representatives agreed to finish these tests by July 1, 1981. This finding will be carried as an inspector followup item and will be reviewed during a subsequent inspection.

- d. The inspector noted that Procedure NC-45 for determination of tritium in liquid waste release composites did not provide for distillation of all samples to separate the tritiated water from interferences nor did the counting procedure monitor potential interferences from other radionuclides. The inspector stated that this could lead to over-reporting of tritium concentrations and that some control should be initiated to prevent this situation from occurring. A licensee representative agreed to revise Procedure NC-45 and include distillation of the sample prior to counting (250/81-06-03, 251/81-06-03). This finding will be carried as an inspector followup item and will be reviewed during a subsequent inspection.

7. Review of Records and Logs

- a. The inspector reviewed the following records and logs:

(1) Ge(Li) Calibration Records for following geometries:

- (a) 1-liter Marinelli, 11-16-79.
- (b) 100-cc gas bomb, 3-4-80.
- (c) 2-inch planchet, 2-5-80.
- (d) 1-liter bottle, 1-28-80.
- (e) 100-cc gas bomb @ 3.2 cm, 2-26-80.
- (f) glass tritium vial, 2-26-80.

(2) Daily Resolution and Energy Checks for Ge(Li) Detectors, 2-3-81 to 3-20-81.

(3) Daily Efficiency Checks for Ge(Li) Detectors, 2-3-81 to 3-20-81

(4) Daily Checks for pH, Boron, and Fluoride, February, 1981

(5) Daily Performance Checks for Gas Flow Proportional Counter, January - March, 1981.

(6) Daily Performance Checks for Liquid Scintillation Counter, January - February, 1981.

(7) Liquid waste Release Spectra, January - February 1981.



(8) Plant Vent Particulate Filter and Charcoal Cartridge Spectra, January - February, 1981.

The inspector discussed the review of records and logs with licensee representatives as noted in paragraph 7b.

- b. Procedure QP 12.1 of the Florida Power and Light Quality Assurance Manual requires that a complete listing of all M&TE within the scope of the procedure be compiled by the responsible organization and that a documented system for assuring that M&TE and reference standards are calibration checked and, if required, maintained and calibrated at prescribed intervals shall be implemented. The inspector determined from licensee representatives that an up to date listing of M&TE for the Chemistry Department was not available. The inspector also determined that the flow rate meter for the waste gas decay tank sampling system had not been calibrated since it was installed and was not on any calibration schedule. The accuracy of the flow rate meter directly affects the accuracy of the effluent measurements for particulate radioactivity and radioiodine associated with releases from the waste gas decay tanks since the integrated flow is determined from the product of the measured flow rate and the sample time. The inspector noted that failure to calibrate or check the accuracy of the flow meter would not have resulted in inaccurate measurements of total plant effluents since the plant vent monitor is sampled to determine total plant releases for particulate radioactivity and radioiodine. The inspector informed licensee representatives that failure to have an up to date list of M&TE equipment with a calibration schedule and failure to calibrate or check the calibration of the flow rate meter was a violation of Technical Specification 6.8.1 for failure to follow QA Manual Procedure, QP 12.1, "Calibration and Control of Measuring and Test Equipment (250/81-06-04, 251/81-06-04)..

8. Confirmatory Measurements

- a. The results of H-3, Sr-89, and Sr-90 analyses of a sample collected on March 26, 1980 and results of licensee analyses of a spiked sample were discussed with the licensee. The results are presented in Table 1 and show agreement for H-3 in the liquid waste sample. The radiostrontium concentration was too low for a valid comparison so a spiked liquid sample was provided for analysis. The Sr-89 results were in agreement but the Sr-90 results were significantly lower and in possible agreement. The inspector stated that this was apparently due to the efficiency calibration technique used by the licensee which does not involve the preparation of separate standards for Sr-89, Sr-90, and Sr-90/Y-90 in the same physical geometry as the separated sample. This was previously identified by the inspector as a potential problem (250/80-08-02, 251/80-08-02), and the spiked samples were provided to determine the validity of the licensee's method. Since the results for



analyses of spiked samples were marginally acceptable, the inspector informed licensee representatives that the validity of the efficiency determination would have to be demonstrated or that an acceptable alternative efficiency calibration would have to be developed. The previously identified item will remain open pending licensee investigation of this item.

- b. Liquid and gaseous samples were collected during this inspection and counted by the licensee and the NRC RII Mobile Laboratory to verify the licensee's capability to measure radionuclides in effluent and reactor coolant samples. Samples were analyzed by gamma ray spectroscopy and included: a liquid waste holdup tank sample, reactor coolant sample, crud filter sample, waste gas decay tank sample and a charcoal cartridge sample. The crud filter was counted in lieu of a particulate filter since a particulate filter with sufficient activity for analysis was not available. An aliquot of the liquid sample was sent to the NRC contract laboratory for tritium and radiostromtium analyses. The results will be compared to licensee results in a subsequent inspection report. This finding will be carried as an inspector followup item and will be reviewed during a subsequent inspection (250/81-06-05, 251/81-06-05).

The comparisons of licensee and NRC results are presented in Table 2 with acceptance criteria in Attachment 1. The results show agreement for all samples except the waste gas decay tank sample and crud filter sample. The results for Cs-137 associated with the crud filter were not in agreement due to overestimation of the area under the Cs-137 662 KeV photopeak. This would result in licensee over reporting for this instance. The licensee is in the process of replacing the current computer-based multichannel analyzer system with a "state of the art" system that should correct this problem. The analysis of the first gas sample showed disagreement for Xe-133, the main constituent in the sample, and a second sample was analyzed. The results from the second sample were in agreement; however, a licensee representative determined that the peak search parameters used for analysis of the first sample were different from those normally used for routine counting. The change in parameters would normally result in overestimation of radionuclide concentrations. The inspector expressed concern that the assignment of parameters was not controlled to ensure that the appropriate values were used. Licensee representatives indicated that the new system did not require adjustment of parameters to the same degree and that the new procedure would ensure that parameters are properly set.

- c. The inspector noted that gas standards were not used for calibration of gas geometries and that simulated gas samples were prepared. The inspector stated that NBS gas samples were available and that when available, NBS Standards or NBS relatable standards should be utilized for calibrations. This finding will be carried as an inspector followup item (250/81-06-06, 251/81-06-06). A licensee representative agreed to implement the use of gas standards as soon as practicable. This item will be reviewed during a subsequent inspection.



- d. During operation of the waste gas decay tank sampling system, the inspector noted the inadequacy of the flow measuring device. The flow meter was mounted on the pump and excessive vibration during sampling made flow measurements difficult to measure. The inspector noted that this problem was related to the failure to calibrate the flow meter which was a violation as discussed in paragraph 7b. If the system had been calibrated or calibration checked while operating, this problem would probably have been identified. A licensee representative indicated that the sampling system will be modified with a new pump that had previously been purchased for this purpose. The licensee agreed to complete modifications of the waste gas decay sampling systems by September 1, 1981 and to correct the excessive vibration problem associated with the flow meter by April 21, 1981.



TABLE 1
 RESULTS OF CONFIRMATORY MEASUREMENTS AT TURKEY POINT, March 1980
 CONCENTRATION, MICROCURIES/CC

<u>Sample Comparison</u>	<u>Isotope</u>	<u>Turkey Point</u>	<u>NRC</u>	<u>Ratio TP/NRC</u>	<u>Resolution</u>	
Liquid Waste 3-26-80	H-3	1.6 E-2	1.58 ± 0.01 E-2	1.01	158	Agreement
	Sr-89	2 E-8	0 ± 1 E-8	-	-	NC
	Sr-90	<2.8 E-9	0 ± 3 E-9	-	-	NC
NRC Spiked	Sr-89	3.4 E-3	3.09 ± .12 E-3	1.10	26	Agreement
Liquid Sample	Sr-90	3.7 E-4	6.2 ± 0.2 E-4	.60	31	Possible Agreement

TABLE 2
 RESULTS OF CONFIRMATORY MEASUREMENTS AT TURKEY POINT, March 1981
CONCENTRATION, MICROCURIES/CC

<u>Sample</u>	<u>Ratio</u>		<u>NRC</u>	<u>TP/NRC</u>	<u>Resolution</u>	<u>Comparison</u>
	<u>Isotope</u>	<u>Turkey Point</u>				
Waste Holdup Tank 3-19-81 @ 0845	I-131	4.6±0.6 E-5	4.3±0.5 E-5	1.15	8.6	Agreement
	Co-58	1.30±0.02 E-3	1.14±0.02 E-3	1.14	57	Agreement
	Co-60	8.0±0.2 E-4	6.7±0.2 E-4	1.19	33.5	Agreement
	Cr-51	2.1±0.5 E-4	9.3±3.6 E-5	2.26	2.6	Agreement
	Cs-1311	1.7±0.1 E-4	1.55±0.09 E-4	1.10	17.2	Agreement
	Cs-137	2.4±0.1 E-4	1.9±0.1 E-4	1.26	19	Agreement
	Sb-124	1.3±0.1 E-4	1.0±0.5 E-4	1.30	2	Agreement
	Sb-125	1.1±0.2 E-4	1.0±0.4 E-5	1.10	2.5	Agreement
Reactor Coolant 3-19-81 @ 0850:00	I-131	1.75±0.01 E-3	1.44±0.08 E-3	1.22	18	Agreement
	I-132	1.49±0.06 E-2	1.30±0.08 E-2	1.15	16	Agreement
	I-133	1.06±0.02 E-2	9.9±0.2 E-3	1.07	49.5	Agreement
	I-134	2.4±0.2 E-2	ND	NC	-	Agreement
	I-135	1.46±0.08 E-2	1.6±0.2 E-2	.91	8	Agreement
	Br-84	5.8±0.3 E-1	ND	NC	-	Agreement
	Cs-134	2.0 ± 0.1 E-3	1.6±0.1 E-3	1.25	16	Agreement
	Cs-138	8±1 E-1	ND	NC	-	Agreement
	Na-24	8.5±0.3 E-3	7.2±0.2 E-3	1.18	36	Agreement

<u>Sample Comparison</u>	<u>Isotope</u>	<u>Turkey Point</u>	<u>NRC</u>	<u>Ratio TP/NRC</u>	<u>Resolution</u>	
Crud Filter 3-20-81	Mn-54	4.6±0.3 E-7	4.1±.7 E-7	1.12	5.9	Agreement
	Cr-51	7.5±.2 E-6	8.1±.8 E-6	.92	10.1	Agreement
	Co-58	2.6±.01 E-5	2.6±.03 E-5	1	86.6	Agreement
	Co-60	3.9±.07 E-6	4.4±.1 E-6	.88	44	Agreement
	Zr-95	5.3±.09 E-6	5.3±.2 E-6	1.0	26.5	Agreement
	Nb-95	3.8±.05 E-6	3.7±.1 E-6	1.02	37	Agreement
	Tc-99	6.7±.1 E-7	6.1±.4 E-7	1.09	15.25	Agreement
	Te-132	2.4±.1 E-7	2.3±.5 E-7	1.04	4.6	Agreement
	Cs-134	1.2±.04 E-6	1.6±.1 E-6	.75	16	Agreement
	Cs-137	6.7±.09 E-6	1.9±.1 E-6	3.52	19	Disagreement
Charcoal Cartridge Plant Vent 3-19-81 @ 15:00	I-131	3.38±.02 E-4	3.26±.01 E-4	1.04	326	Agreement
	I-133	1.0±0.2 E-4	6.5±1.7 E-5	1.5	3.8	Agreement
Waste Gas Decay Tank Sample No. 1	Xe-133	2.03±.03 E-2	1.42±.004 E-2	1.43	355	Disagreement
	Kr-85	1.3±0.2 E-3	7.1±3.2 E-4	1.86	2.22	Agreement
	Kr-85m	9.7±1.8 E-6	ND	NC	-	NC
	Xe-131m	7.6±0.3 E-4	5.1±3.7 E-4	1.49	1.4	Agreement
	Xe-133m	4.1±0.4 E-5	4.3±0.6 E-5	.95	7	Agreement
Xe-135	1.31±0.07 E-5	8.4±0.9 E-6	1.56	9	Agreement	
Waste Gas Decay Tank 3-20-81 Sample No. 2	Xe-131m	2.42±0.06 E-3	4.4±0.4 E-4	.55	11	Possible Agreement
	Xe-133m	3.2±0.4 E-5	3.2±0.8 E-5	1.0	4	Agreement
	Xe-133	1.40±0.01 E-5	1.29±.004 E-5	1.09	32	Agreement
	Xe-135	5.4±0.5 E-6	3.7±1.2 E-6	1.46	3.1	Agreement

ND - Not Detected,

NC - No Comparison



Attachment 1

CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

This attachment provides criteria for comparing results of capability tests and verification measurements. The criteria are based on an empirical relationship which combines prior experience and the accuracy needs of this program.

In these criteria, the judgment limits are variable in relation to the comparison of the NRC Reference Laboratory's value to its associated uncertainty. As that ratio, referred to in this program as "Resolution", increases, the acceptability of a licensee's measurement should be more selective. Conversely, poorer agreement must be considered acceptable as the resolution decreases.

$$\text{RATIO} = \frac{\text{LICENSEE VALUE}}{\text{NRC REFERENCE VALUE}}$$

<u>Resolution</u>	<u>Agreement</u>	<u>Possible Agreement A</u>	<u>Possible Agreement B</u>
<3	0.4 - 2.5	0.3 - 3.0	No Comparison
4 - 7	0.5 - 2.0	0.4 - 2.5	0.3 - 3.0
8 - 15	0.6 - 1.66	0.5 - 2.0	0.4 - 2.5
16 - 50	0.75 - 1.33	0.6 - 1.66	0.5 - 2.0
51 - 200	0.80 - 1.25	0.75 - 1.33	0.6 - 1.66
>200	0.85 - 1.18	0.80 - 1.25	0.75 - 1.33

"A" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is greater than 250 Kev.

Tritium analyses of liquid samples.

"B" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is less than 250 Kev.

⁸⁹Sr and ⁹⁰Sr Determinations.

Gross Beta where samples are counted on the same date using the same reference nuclide.

