UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

April 28, 1995

Report Nos: 50-250/95-05 and 50-251/95-05

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, FL 33102

Docket Nos.: 50-250 and 50-251 License Nos.: DPR-31 and DPR-41

Facility Name: Turkey Point 3 and 4

Inspection Conducted: March 6-10 and March 28-29, 1995

Inspector: R. P. Carrion 27 APR '95
R. P. Carrion, Radiation Specialist Date Signed

Approved by: T R Decker 4/27/95
T. R. Decker, Chief Date Signed
Radiological Effluents and Chemistry Section
Radiological Protection and Emergency Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of organization of the Chemistry Department, plant water chemistry, confirmatory measurements, the Annual Radiological Environmental Operating Report, radiological liquid and gaseous effluent releases, the Radiological Environmental Monitoring Program (REMP), radiologically-contaminated aquatic grass, contingencies for long-term storage of Low Level Radwaste (LLW), and previously-addressed items.

Results:

The staffing levels of the Chemistry Department were stable and satisfied TS requirements. (Paragraph 2)

The licensee maintained an effective over-all chemistry program to inhibit degradation due to corrosion/erosion of components of both the primary and secondary systems. (Paragraph 3)

The licensee's Annual Radioactive Effluent Release Report was complete and satisfied regulatory requirements. (Paragraph 4)

The licensee's programs for preparing liquid waste release permits, doing the associated sampling and sample analysis, and controlling the execution of the release were effectively implemented. (Paragraph 5)

The licensee had a good program in place to detect the effects of radiological effluents, direct radiation, etc. due to plant operations and those operations had caused minimum impact to the environment and virtually no dose to the general public. (Paragraph 6)

One Non-Cited Violation (NCV), 50-250, 251/95-05-02, resulted from the licensee's inadequate surveying of radiologically-contaminated aquatic vegetation. (Paragraph 7)

The licensee continued to explore innovative ideas to reduce solid radwaste volume and had prepared contingency plans for long-term storage of low level radioactive waste. (Paragraph 8)

Previously-identified items resulted in the closure of VIO 50-250, 251/94-04-03 and the resolution of Unresolved Item (URI) 50-250, 251/94-04-01 into Non-Cited Violation (NCV) 50-250, 251/95-05-01. (Paragraph 9)

REPORT DETAILS

1. Persons Contacted

Licensee Employees

T. V. Abbatiello, Site Quality Manager
*J. E. Berg, Radiochemistry Supervisor
#*J. L. Danek, Corporate Health Physics (HP)
E. English, Senior Analyst, Nuclear Division (Corporate)
#*D. E. Jernigan, Plant Manager
V. Kaminskas, Service Manager
*J. E. Knorr, Regulation and Compliance Specialist
D. J. Lee, Primary Operations Supervisor
J. D. Lindsay, HP Supervisor
K. W. Petersen, Site Superintendent of Land Utilization
*C. V. Rossi, Quality Assurance (QA) Supervisor
R. K. Rowe, Health Physics Engineer
*A. Singer, Operations Supervisor
#*R. N. Steinke, Chemistry Supervisor
D. Tomaszewski, Acting Technical Manager
#*E. J. Weinkam, Licensing Manager

Other licensee employees contacted during this inspection included technicians and administrative personnel.

Florida Department of Health and Rehabilitative Services (DHRS)

L. Dallas, Public Health Physicist II

Nuclear Regulatory Commission (NRC)

B. Desai, Resident Inspector
#*T. Johnson, Senior Resident Inspector
*J. King, Resident Inspector (Intern)
*L. Trocine, Resident Inspector

*Attended exit interview on March 10, 1995.
#Attended exit interview on March 29, 1995.

Acronyms and Initialisms used throughout this report are listed in the last paragraph.

2. Organization (84750)

Technical Specification (TS) 6.2.2 describes the licensee's onsite facility organization. The inspector reviewed the licensee's organization, staffing levels, and lines of authority as they related to the Chemistry Department to verify that the licensee had not made organizational changes which would adversely affect the ability to control radiation exposures or radioactive material. The inspector discussed the organization of the Chemistry Department with the Chemistry Supervisor and determined that the department consisted of

twenty-four employees divided into the following five functional units: Radiochemistry, Primary Operations, Secondary Operations, Hazardous Materials, and the Technical Group. Each functional unit was headed by a supervisor who directed a team of technicians. The most important change to the department had been that the maintenance inspection operations (sludge lancing, eddy current inspection, etc.) of the Steam Generators had been assigned to it to assure that strict chemical controls were maintained.

The inspector concluded that the organization and staffing levels satisfied TS requirements.

No violations or deviations were identified.

3. Plant Water Chemistry (84750)

At the beginning of the inspection (March 6-10), Turkey Point Units 3 and 4 were operating at 100 percent and 0 percent power, respectively. However, Unit 3 was forced to reduce power production on March 9 due the flow rate through the Intake Cooling Water System being below its minimum required flow rate. This occurred due to extensive fouling of the traveling screens of the intake structure by aquatic grasses which had become dislodged by recent storm activity. Unit 4 had been taken off line to repair a letdown system valve and a pressurizer spray valve and was expected to restart on March 11. Unit 3 was in its fourteenth fuel cycle and Unit 4 was in its fifteenth fuel cycle. Refueling outages were scheduled to begin September 1, 1995 (Unit 3) and March 1, 1996 (Unit 4). The inspector reviewed the plant chemistry controls and operational controls affecting plant water chemistry.

a. Primary Plant Water Chemistry

1. TS-Required Parameters

TS 3.4.7 specifies that the concentrations of dissolved oxygen (DO), chloride, and fluoride in the Reactor Coolant System (RCS) be maintained below 0.10 parts per million (ppm), 0.15 ppm, and 0.15 ppm, respectively. TS 3.4.8 specifies that the specific activity of the primary coolant be limited to less than or equal to 1.0 microcuries/gram (μCi/g) dose equivalent iodine (DEI).

These parameters are related to corrosion resistance and fuel integrity. The oxygen parameter is based on maintaining levels sufficiently low to prevent general and localized corrosion. The chloride and fluoride parameters are based on providing protection from halide stress corrosion. The activity parameter is based on minimizing personnel radiation exposure during emergency operation and maintenance.

Pursuant to these requirements, the inspector reviewed

tabular daily summaries which correlated reactor power output to chloride, fluoride, and dissolved oxygen concentrations, and DEI of the reactor coolant for the period of January 1, 1995 through February 28, 1995 and determined that all of the parameters were maintained well below TS limits. Typical values for DO and chloride were less than two parts per billion (ppb) and less than two ppb, respectively, for both units. Typical fluoride concentrations were four ppb and eight ppb, respectively, for Unit 3 and Unit 4. Typical DEI values were 3.2E-3 μCi/g for Unit 3 and 1.2E-3 μCi/g for Unit 4.

There was no evidence of leaking fuel in either unit at this time.

2. Early Boration

The inspector discussed the licensee's early boration program with the Primary Operations Supervisor. During the last Unit 3 outage, the licensee had removed 215.75 curies of activity, virtually all of which was from Co-58. However, Unit 4 did not go through an early boration procedure during its last outage because the outage began sooner than planned when the plant tripped.

b. Secondary Water Chemistry for Steam Generators (SGs)

1. General Program

TS 6.8.4.c requires the licensee to establish, implement, and maintain a Secondary Water Chemistry Program to inhibit SG tube degradation.

The inspector reviewed and discussed the results of licensee's program, including sludge lancing and tube plugging.

a. Sludge Lancing

Since plant startup, sludge lancing has been carried out during the respective refueling outages of each unit since the replacement of the SGs. A summary of sludge removed follows on the next page.

Turkey Point Sludge Removal History

Fuel Cycle No.	Unit 3 (lbs.)	Unit 4 (lbs.)
8	NM*	---
9	211	NM*
10	153	125
11	468	418
12	192	115
13	893	247
14	-*-	613

Note: NM* means that no measurable amounts were removed during the sludge lancing process.
--- means that sludge lancing was not done during the refueling outage.
-*- means that sludge lancing will be performed during the upcoming refueling outage.

b. Steam Generator Tube Plugging

The inspector discussed tube plugging of the steam generators with the Chemistry Supervisor. Since the Unit 3 SGs were replaced and the new ones placed in service in February 1982, 17, 16, and 33 total tubes had been plugged to date in SG "A," SG "B," and SG "C," respectively. Also, since the Unit 4 SGs were replaced and the new ones placed in service in February 1983, 16, 8, and 9 total tubes had been plugged to date in SG "A," SG "B," and SG "C," respectively.

2. Secondary Chemistry Laboratory

The inspector toured the licensee's new Secondary Chemistry Laboratory. The laboratory was arranged by unit on the first floor in such a way that there was a "wet" end where cation columns and hard piping to several sampling sources (including the Main Steam Line moisture separators, the condenser hot well, condensate, feedwater, and steam generator blowdown) were located. From there it was possible to take raw (unprocessed) samples or samples of the effluent from the cation columns. Next were eight sodium analyzers (one for each steam generator (three total), one for the feedwater, one for each of the four condenser hotwells). The licensee stated that these analyzers were extremely accurate (to the high part per trillion range) and were relatively low maintenance items. Next were five oxygen analyzers; three for condensate headers (two of which

were normally in operation at a time), one for the feedwater header, and one was a spare. An analyzer for hydrazine in the feedwater was next followed by the silica analyzer for the steam generators. Conductivity of each system was available as well. The above description was basically the same for either unit. However, the Unit 3 side of the laboratory also included an ion chromatograph (IC) which was used for both units and the licensee was completing the installation of a new capillary ion analyzer which would be used for quick, accurate (from about 0.5 to 20 ppb) sample analysis. A microwave for feedwater iron and copper samples was also available. At the end opposite the "wet" end, the Plant Information (PI) computer system was located. It tracked all of the information available from the above-referenced in-line analyzers and made the information available to the Control Room. The second floor housed the Clean Room which will be used to prepare low level standards. (It had not been outfitted at the time of the inspection.) It had its own computer-driven ventilation system, complete with High Efficiency Particulate Air (HEPA) filters. In addition, a storage room for small quantities of analytical laboratory chemicals, a special flammable/explosive storage room outfitted with special spark proof lighting, the computer-driven ventilation system for the building, and the power supply room which would supply and regulate electrical power for the entire laboratory and especially the computers during a power outage, were located on the second floor of the building.

The inspector concluded from the above that the licensee had maintained an effective over-all chemistry program to inhibit degradation due to corrosion/erosion of components of both the primary and secondary systems.

No violations or deviations were identified.

4. Annual Radioactive Effluent Release Report (84750)

TS 6.9.1.4 and 10 CFR 50.36(a)(2) require the licensee to submit an Annual Radiological Effluent Release Report within the time periods specified covering the operation of the facility during the previous year of operation. The TS also states the requirements for the content and format of the report. The inspector reviewed the reports for 1993 and compared the results to those of 1991 and 1992 to verify compliance and to determine trends which might have occurred in liquid and gaseous effluent releases. These data are summarized as follows on the next page.

Turkey Point Radioactive Effluent Release Summary

	1991	1992	1993
Unplanned Releases			
Liquid	3	0	0
Gaseous	0	0	0
Activity Released (curies)			
a. Liquid			
1. Fission and Activation Products	7.36E-1	3.74E-1	5.16E-1
2. Tritium	1.13E+2	4.42E+2	5.76E+2
3. Gross Alpha	< LLD	< LLD	< LLD
b. Gaseous			
1. Fission and Activation Gases	1.84E+1	1.23E+2	5.66E+2
2. Iodines	1.27E-3	2.08E-4	2.90E-3
3. Particulates	3.46E-5	2.38E-5	3.57E-6
4. Tritium	2.91E-1	3.96E-2	9.26E+0

A comparison of data from liquid and gaseous effluents 1991, 1992, and 1993 showed an increasing trend in liquid and gaseous tritium and gaseous fission and activation products. No trends were evident from the other data.

The inspector reviewed the hypothetical maximum yearly dose estimates to a member of the public located at the site boundary from radioactive materials in gaseous and liquid effluents released during 1993 as reported in the Radioactive Effluent Release Report. (The NRC PC-DOSE computer code was not available during this inspection to verify the licensee's calculation for the dose contribution to the maximum exposed individual from the radionuclides in liquid and gaseous effluents released to unrestricted areas.) The following table includes the annual dose calculations due to gaseous and liquid effluents for 1993:

Turkey Point Power Station
Cumulative Estimated Doses from Effluents

Dose Pathway	1991	1992	1993	Annual Limit
Airborne				
Gamma Air Dose (mrad)	1.30E-4	9.54E-4	4.52E-3	10
Beta Air Dose (mrad)	3.68E-4	2.51E-3	1.30E-2	20
Critical Organ Dose (Infant Thyroid - mrem)	2.00E-2	3.28E-3	2.04E-2	15

Liquid				
Total Body Dose (Teenager - mrem)	4.56E-3	5.04E-3	2.68E-3	3

The release of radioactive material to the environment from Turkey Point for the year was a small fraction of the 10 CFR 20, Appendix B and 10 CFR 50, Appendix I limits. As can be seen from the data presented previously, the annual dose contributions to the maximum-exposed individual from the radionuclides in liquid and gaseous effluent released to unrestricted areas were all less than one per cent of the limits specified in the Off-site Dose Calculation Manual (ODCM). The inspector noted that for the three-year period, the gamma and beta air doses had shown a moderate rising trend, while the critical organ dose due to airborne effluents and doses due to liquid effluents showed no trend.

There was one change to the Process Control Program (PCP). A vendor's solidification process control procedure was deleted from the PCP upon the conclusion of a licensee solidification campaign. The ODCM was also revised during this reporting period.

No gas storage tanks exceeded the limits allowed by TS 3.11.2.6 (70,000 Curies of noble gas, considered as Xe-133 equivalent) during this reporting period.

The following table summarizes solid radwaste shipments for burial or disposal for the previous three years. These shipments typically include spent resin, filter sludge, dry compressible waste, and contaminated equipment.

Turkey Point Solid Radwaste Shipments

	1991	1992	1993
Number of Waste Disposal Shipments	38	39	28
Volume (cubic meters)	188.9	210.2	90.4
Activity (curies)	11.6	230.0	140.2

For solid radwaste, no significant trends were noted for the period reviewed.

The inspector concluded that the Annual Radioactive Effluent Release Report was complete and satisfied regulatory requirements.

No violations or deviations were identified.

5. Gaseous and Liquid Releases (84750)

TSs 3/4.11.1 state the requirements for concentrations and defines the sampling and analysis program for liquid effluents. TSs 3/4.11.2 define the dose rates for gaseous effluents.

a. Release Records

The inspector reviewed four randomly-selected Liquid Release Permits (LRP-95-34, LRP-95-36, LRP-95-42, and LRP-95-46) and three randomly-selected Gaseous Release Permits (GDT-94-002, GDT-94-004, and GDT-94-006) to verify compliance. The permits were found to be complete and included such release information as the identification of the source of the release, the sample analysis, the activity released (identified by isotope), and the volume of the effluent discharged. Pre-release calculations were complete and included dose projections to the public (including whole body and critical organ) as well as the percentage of 10 CFR 50 quarterly and annual limits. The release history included the release start and stop times as well as radiation monitor (R-18) information. The post-accountability calculations determined total activity released and verified compliance with 10 CFR 20 limits and quarterly and annual limits of 10 CFR 50.

b. Release Activities

The inspector reviewed selected portions of the procedure used to generate a Liquid Release Permit (LRP-95-049, from Waste Monitor Tank "A") and to obtain a liquid sample. Specifically, the inspectors reviewed selected parts of Procedure No. 0-OP-061.11, "Waste Disposal System Controlled Radiological Liquid Release," approved September 29, 1994. The inspector concluded that these documents were adequate for the intended purpose. The inspector observed a licensee technician obtain a liquid grab sample and return it to the Count Room for analysis and noted that the procedures were followed closely. Proper sampling techniques and health physics practices were employed. Upon completion of the analysis, the Control Room was given the Release Permit for execution. The inspector observed the operators as they made the valve alignments, independently verified the alignments, and coordinated the actual release with the Control Room. The activities were executed in a competent manner.

Based upon the above observations, the inspector concluded that the licensee's programs for preparing liquid waste release permits, doing the associated sampling and sample analysis, and controlling the execution of the release were being effectively implemented and that regulatory requirements were satisfied.

No violations or deviations were identified.

6. Annual Radiological Environmental Operating Report (84750)

TS 6.9.1.3 requires that the Annual Report be submitted prior to May 1 of the following year. TS 6.9.1.3 also states format and content requirements for the Report.

a. 1993 Annual Radiological Environmental Operating Report

The inspector reviewed the Annual Environmental Operating Report for calendar year 1993 to verify compliance with the TSs. (The report for calendar year 1994 had not yet been completed at the time of this inspection.) The Report had been submitted in compliance with TS 6.9.1.3 on April 25, 1994, and the format and contents were as prescribed by the TS. There were no changes to the environmental monitoring network during 1993. The inspector determined that the Report was in compliance with the TSs.

The Turkey Point Nuclear Plant Environmental Monitoring Program is designed to detect the effects, if any, of plant operation on environmental radiation levels by monitoring airborne, waterborne, ingestion, and direct radiation pathways in the area surrounding the plant site. It also supplements the Radiological Effluent Monitoring Program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and the modeling of the environmental exposure pathways. Indicator sampling stations are located where detection of the radiological effects of the plant's operation would be most likely, where the samples collected should provide a significant indication of potential dose to man, and where an adequate comparison of predicted radiological levels might be made with measured levels. Control stations are located where radiological levels are not expected to be significantly influenced by plant operation, i.e., at background locations. An environmental impact assessment of plant operation is made from the radiological measurements of the sampling stations. Those measurements verified that the dose to members of the public were well within the limits established by 10 CFR 50, Appendix I.

Specifically, the report noted the following:

1) Direct Radiation

Direct radiation exposure in the plant environs was measured by the placement of thermoluminescent dosimeters (TLDs) at twenty-one locations around the plant, which were collected and analyzed quarterly. All first quarter results were unavailable due to exposure during transit. However, results for the remainder of the year were consistent with those of previous years. The mean of sixty-one samples from indicator locations was 5.6 micro-Rad/hour (μR/hr)

2) Air Particulates/Radioiodine

206 air samples were collected from indicator stations and 52 from control stations throughout 1993, with the following results:

- In all cases, I-131 activities were less than the Lower Limit of Detection (LLD).

- The mean gross beta activity was the same for the indicator stations vs. the control stations (1.3E-2 picocuries per cubic meter (pCi/m^3)). The only identified radioisotopes were the naturally-occurring Be-7 and K-40 at levels consistent with past measurements. No discernable impact from plant operations was apparent from the data.

- Quarterly composite gamma analyses for air particulate samples revealed no radionuclides typical of plant effluents.

3) Waterborne

a. Surface Water

Twenty-four surface water samples were collected from indicator stations and 12 from control stations throughout 1993, with the following results:

- Eight of twenty-four samples indicated a presence of tritium (a beta emitter) which was attributed to plant operations. However, the highest reported tritium concentration (937 pCi/l) was less than four percent of the reporting value specified in the TSs. The mean activity levels had remained consistent with past measurements.

- Gamma analyses of monthly composites of surface water samples detected no radionuclides typical of plant effluents.

b. Sediment

No radionuclides of plant origin were detected in the four samples of shoreline sediment. Consistent with past measurements, only naturally-occurring radionuclides were detected.

4) Food Products

Two samples of free-swimming fish and two samples of bottom-feeding crustacea were collected throughout 1993. The results for the year were consistent with those of previous years; only naturally-occurring radionuclides were detected.

5) Broadleaf Vegetation

One control and two indicator stations were utilized for sampling broadleaf vegetation. Twenty-four of twenty-four samples taken from the indicator sites contained concentrations of Cs-137 with an average of 8.90E-1 picocuries per kilogram (pCi/kg) (wet), while one of twelve of the samples taken from the control site contained a detectable concentration of Cs-137 (1.4E-1 pCi/kg (wet)). The maximum concentration (426 pCi/kg) was approximately twenty-two per cent of the reporting level.

b. Analytical Comparison of 1993 Report

Radiological environmental monitoring for the Turkey Point Plant is conducted by the State of Florida, Department of Health and Rehabilitative Services (DHRS). Samples are collected and analyzed by DHRS personnel at the DHRS Environmental Radiation Control Laboratory in Orlando, Florida.

The NRC contracts with the Radiological and Environmental Sciences Laboratory (RESL) to analyze samples split between the State of Florida and the NRC. The NRC compares the RESL results to those of the State of Florida for analysis confirmation.

The inspector compared a random selection of analytical results for gross beta in air particulates at Sample Station T-58 as well as the isotopic analysis for broadleaf vegetation, specifically the Brazilian Pepper at Sample Station T-40, as reported in the 1990 Annual Report. After adjusting for the different units used by the different laboratories to report the results, the inspector determined that the reported results compared favorably with those of RESL. Typical values for gross beta in the air particulates were 0.010 pCi/m^3 and for the broadleaf vegetation 38 pCi/kg (for Cs-137) and 3200 pCi/kg (for K-40).

The inspector discussed his findings with the Chemistry Supervisor and concluded that the State of Florida was capable of analyzing environmental samples as required for the Annual Radiological Environmental Operating Report.

c. Observation of Sample Collection

The inspector accompanied the Health Physicist on part of his normal weekly sample collection rounds, to observe collection technique and to check the physical location. Water samples were taken at three indicator stations (T-42, T-81, and T-97) and a broad-leaf vegetation sample (Brazilian pepper) was collected at indicator station T-41. The inspector observed that the samples were properly collected and that the technician used good HP techniques to avoid sample contamination and conducted his work in an efficient, competent manner.

7. Radiologically-Contaminated Aquatic Vegetation (92701)

The licensee established its Service Water Self-Assessment Team in January 1995 to conduct an assessment to include the same items identified in the NRC Temporary Instruction (TI) 2515/118, Rev. 1, using Inspection Procedure 40501. In the course of its work, the team requested a sample of the aquatic vegetation found in the Component Cooling Water (CCW) basket strainer. Because the sample was taken inside the Radiation Controlled Area (RCA), Procedure O-HPS-021.3, "Release of Material from the Radiation Controlled Area," required that it be surveyed to "ensure compliance with regulations and procedures prior to removal." The sample was analyzed by the HP staff in the HP Counting Room on March 16, 1995 and was determined to contain Mn-54 (a corrosion activation product associated with Fe-56, V-51, Cr-53, and Cr-54, typical of nuclear power plant operations). The sample was later analyzed by the Chemistry staff and found to contain Mn-54 at a concentration of 1.76E-7 microCuries per milliliter, independently confirming the results of the HP staff. (The inspector noted that this was the only radioisotope found in this analysis.) This finding was unexpected by the licensee, which had previously thought that there was no activity in the aquatic vegetation entering the Intake Structure. Furthermore, the licensee had disposed of the aquatic vegetation (collected in the weir pit after being removed from the traveling screens of the Intake Structure prior to entering the CCW System inside the RCA) at the Black Point Landfill since early 1994. On March 20, 1995, the licensee analyzed additional samples from the traveling screens and the CCW basket strainers and found Mn-54 in all samples and Co-58 and/or Co-60 in some. (The inspector noted that the total activity of the naturally-occurring isotopes was greater than that of the identified activation products, from between 1.2 to 48 times greater.) The licensee stopped any further disposal of this material to the landfill on that date. Additional samples were collected and analyzed on the following day. The inspector noted the same relation between the naturally-occurring isotopes and the activation products, with the range being 4.1 to 47. (One exception was noted where the activity of the activation products was greater than that of the naturally-occurring isotopes. Discussions with cognizant licensee personnel determined that the sample in question was counted using a different geometry than the other samples. It was counted using a one-liter wide-mouth bottle placed on the face of the detector, whereas

the other samples were counted using a one-liter Marenelli container which fits over and surrounds the face of the detector and yields more accurate information.) The State of Florida took independent samples for analysis and concurred with the results obtained by the licensee.

The licensee estimated the maximum exposure and dose to the operator of the landfill using Reg. Guide 1.109 and conservative assumptions. The calculations showed that the exposure to the operator would be 0.97 mrem per year. The inspector reviewed the calculations and concurred.

The licensee had made no surveys of the aquatic vegetation prior to its disposal at the Black Point Landfill, even though the plant cooling water system is a closed recirculating system into which liquid radwaste effluents are released (into the discharge waters prior to entering the cooling canals). It is reasonable to expect that some of the radionuclides so released would become concentrated via biological mechanisms. Such concentrations are detectable. Therefore, this is a violation of 10 CFR 20.1501(a) which requires, in part, that "each licensee shall make, or cause to be made, surveys that are reasonable under the circumstances to evaluate (i) the extent of radiation levels; and (ii) concentrations or quantities of radioactive material; and (iii) the potential radiological hazards that could be present." However, because the licensee had identified the issue and had taken extensive corrective actions to evaluate and determine its cause and to preclude its recurrence, and the issue carried a relatively low safety significance, and the criteria specified in Section VII.B of the Enforcement Policy were met, this issue will be tracked as a Non-Cited Violation (NCV). This will be tracked as NCV 50-250,251/95-05-02, "Inadequate Survey of Aquatic Vegetation."

8. Low Level Radwaste (LLW) (84760)

a. Radwaste Volume Reduction

1. Liquid Radwaste

Discussions with cognizant licensee personnel determined that the licensee was reducing the volume of demineralizer resins used to treat liquid radwaste via a regeneration process performed by a vendor. The goal was for the resin to process 1000000 gallons of liquid radwaste per cubic foot prior to exhaustion. Annual site generation rates for the resin were expected to be 100 to 150 cubic feet. Another reason for the better performance of the resins was that an ultra-filtration unit had been installed in the RCS which removed suspended solids of diameters as small as 0.45 micrometers (μm). This unit removed approximately 95% of the crud in the system.

2. Solid Radwaste

The licensee had assembled a Radwaste Minimization Team to review all aspects of solid radwaste in an effort to reduce it at all steps of the generation cycle, from changing work processes to procedural changes to using washable materials in place of disposables for everything from protective clothing and shoe covers to tool bags. The licensee was working toward July 31, 1995 for full implementation and expected to realize the results of this effort with the Unit 3 outage in the autumn.

b. Status of Turkey Point LLW Storage Contingencies

The inspector requested an update on the contingencies being pursued by the Turkey Point management with respect to LLW long-term on-site storage and discussed those with cognizant licensee personnel. Detailed plans were not reviewed but the licensee indicated that the more highly contaminated materials, such as primary resin and filter waste would be placed in concrete storage containers on a concrete pad surrounded by modular shield walls. For Dry Active Waste (DAW), the licensee estimated that its storage capacity was adequate for several years.

The inspector concluded that the licensee was making a good effort to reduce radwaste and that the storage contingencies were appropriate.

No violations or deviations were identified.

9. Previously-Identified Items (92701)

a. Violation 50-250, 251/94-04-03, "Failure to have adequate specialized training as required by TS 6.4 for proper use of LSC counting equipment."

This violation was detailed in Paragraph 2.d of IR 50-250, 251/94-04 and followed up by the inspector during the current inspection to review the adequacy of the corrective actions taken by the licensee. The licensee had conducted extensive training for the Liquid Scintillation Counter (LSC) since the identification of the violation. A representative of the manufacturer of the LSC conducted a two-hour lecture on May 24, 1994 to supplement the licensee's normal training program. Also, as part of the licensee's continuing training program, tritium counting was included as one of five subjects reviewed. In addition, the inspector reviewed the instructional matrix for Lesson Package No. 2100073, "The Operation of a Liquid Scintillation Detector," including Lesson Plan No. 2102073, Operation of a Liquid Scintillation Detector," Job Performance Measure No. 2107073C, "Perform Tritium Determination (0-NCAP-212)," Job Performance Measure No. 2107073B, "Perform a Calibration of the Packard Model

2250CA Liquid Scintillation Counter (O-NCCP-102)," and Student Handout No. 2110073, "Operation of a Liquid Scintillation Detector." The inspector determined that the materials were detailed and complete and that the licensee had taken appropriate corrective action to upgrade training on the referenced equipment. Therefore, Violation 50-250, 251/94-04-03, "Failure to have adequate specialized training as required by TS 6.4 for proper use of LSC counting equipment," is closed.

b. Unresolved Item (URI) 50-250, 251/94-04-01, "Determine Adequacy of Licensee H-3 and Fe-55 Analytical Measurements for Selected Effluent Analysis as Required by 10 CFR 20.1501."

This URI was detailed in Paragraph 2.a of IR 50-250, 251/94-04 and followed up by the inspector during the current inspection in an effort to establish if a basis for resolution could be established for this issue. The inspector determined that there was sufficient grounds to resolve the issue as a violation due to the facts that: (1) the licensee's reported concentration results generated using its LSC automatic analysis protocol (internal algorithms) for H-3 analyses were approximately twenty percent less than the known values; and (2) the efficiencies generated by the LSC algorithm differed significantly from the efficiency determined from manual calculations using the H-3 activity detected within the appropriate energy ranges established on the LSC equipment. However, since then the licensee had taken extensive corrective actions to evaluate and determine the cause of the non-conservative bias including: photomultiplier tube degradation; the liquid scintillation cocktail used; potential electronic drift of the instrument; analytical procedures; and extensive cross checking with vendors, and the Chemistry Department of a sister nuclear plant. These efforts had produced positive results, as evidenced by the analysis of the three samples supplied by the NRC's contractor laboratory. (Refer to Attachment 1.) Although the licensee results of the analysis of one sample showed a disagreement for H-3 (the difference being fifty percent), the other two licensee results were within four percent of the sample's known value. Licensee results for Fe-55 analysis were within the acceptance criteria for all three samples. These issues carried a relatively low safety significance, the licensee took appropriate corrective actions, and the criteria specified in Section VII.B of the Enforcement Policy were met. Therefore, this issue will be tracked as Non-Cited Violation (NCV) 50-250, 251/95-05-01, "Failure to accurately analyze samples for H-3 and Fe-55."

10. Exit Interview (84750)

The inspection scope and results were summarized on March 10 and March 29, 1995 with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed the inspection results, including likely informational content of the inspection report

with regard to documents and/or processes reviewed during the inspection. The licensee did not identify any such documents or processes as proprietary. Dissenting comments were not received from the licensee.

Item Number	Status	Description and Reference
50-250, 251/94-04-01	Closed	URI - Determine Adequacy of Licensee H-3 and Fe-55 Analytical Measurements for Selected Effluent Analysis as Required by 10 CFR 20.1501. (Paragraph 9).
50-250, 251/94-04-03	Closed	VIO - Failure to have Adequate Specialized Training as required by TS 6.4 for Proper Use of LSC Counting Equipment. (Paragraph 9).
50-250, 251/95-05-01	Closed	NCV - Failure to Accurately Analyze Samples for H-3 and Fe-55. (Paragraph 9).
50-250, 251/95-05-02	Closed	NCV - Inadequate Survey of Aquatic Vegetation. (Paragraph 7).

11. Acronyms and Initialisms

CCW - Component Cooling Water
CFR - Code of Federal Regulations
DAW - Dry Active Waste
Ci - curie
DEI - Dose Equivalent Iodine
DHRS - Department of Health and Rehabilitative Control
DO - Dissolved Oxygen
g - gram
GDT - Gas Decay Tank
HEPA - High Efficiency Particulate Air
HP - Health Physics
hr - hour
IC - Ion Chromatograph
IR - Inspection Report
kg - kilogram
l - liter
lb - pound
LLD - Lower Limit of Detection
LLW - Low Level Radwaste
LRP - Liquid Release Permit
LSC - Liquid Scintillation Counter
μCi - micro-Curie (1.0E-6 Ci)
μm - micro-meter (1.0E-6 meter)
μR - micro-Rad (1.0E-6 Rad)

m - meter
mRad - milli-Rad
mrem - milli-rem
NCV - Non-Cited Violation
No. - Number
NRC - Nuclear Regulatory Commission
ODCM - Off-site Dose Calculation Manual
pCi - pico-Curie (1.0E-12 Ci)
PCP - Process Control Program
PI - Plant Information
ppb - parts per billion
ppm - parts per million
QA - Quality Assurance
RCA - Radiation Control Area
RCS - Reactor Coolant System
REMP - Radiological Environmental Monitoring Program
RESL - Radiological and Environmental Sciences Laboratory
SG - Steam Generator
TI - Temporary Instruction
TLD - Thermoluminescent Dosimetry
TS - Technical Specification
URI - Unresolved Item
VIO - Violation

ATTACHMENT 1

COMPARISON OF NRC AND TURKEY POINT ANALYTICAL RESULTS
REPORTED JUNE 24, 1994

Type of Sample: Unknown NRC Spikes (Sample No. NRC-94-2)
Units: μCi/ml

Radio-nuclide	Licensee's Value (μCi/ml)	NRC Value (μCi/ml)	Reso-lution	Ratio	Compar-ison
H-3	3.42 E-5	(3.29 +/- 0.16)E-5	20	1.04	Agree
Fe-55	2.19 E-5	(2.68 +/- 0.13)E-5	20	0.82	Agree
Sr-90	3.86 E-6	(3.03 +/- 0.15)E-6	20	1.27	Agree

Type of Sample: Unknown NRC Spikes (Sample No. NRC-94-3)
Units: μCi/ml

Radio-nuclide	Licensee's Value (μCi/ml)	NRC Value (μCi/ml)	Reso-lution	Ratio	Compar-ison
H-3	3.65 E-5	(3.74 +/- 0.19)E-5	20	0.98	Agree
Fe-55	2.44 E-5	(3.07 +/- 0.15)E-5	20	0.79	Agree
Sr-90	3.88 E-6	(3.36 +/- 0.17)E-6	20	1.15	Agree

Type of Sample: Unknown NRC Spikes (Sample No. NRC-94-5)
Units: μCi/ml

Radio-nuclide	Licensee's Value (μCi/ml)	NRC Value (μCi/ml)	Reso-lution	Ratio	Compar-ison
H-3	6.18 E-5	(4.12 +/- 0.21)E-5	20	1.50	Disagree
Fe-55	2.28 E-5	(2.77 +/- 0.14)E-5	20	0.82	Agree
Sr-90	2.39 E-6	(2.40 +/- 0.12)E-6	20	1.00	Agree

ATTACHMENT 2

CRITERIA FOR COMPARISONS OF ANALYTICAL MEASUREMENTS

This attachment provides criteria for the comparison of results of analytical radioactivity measurements. These criteria are based on empirical relationships which combine prior experience in comparing radioactivity emission, and the accuracy needs of this program.

In these criteria, the "Comparison Ratio Limits"[1] denoting agreement or disagreement between licensee and NRC results are variable. This variability is a function of the ratio of the NRC's analytical value relative to its associated statistical and analytical uncertainty, referred to in this program as "Resolution".[2]

For comparison purposes, a ratio between the licensee's analytical value and the NRC's analytical value is computed for each radionuclide present in a given sample. The computed ratios are then evaluated for agreement of disagreement bases on "Resolution." The corresponding values for "Resolution" and the "Comparison Ratio Limits" are listed in the Table below. Ratio values which are either above or below the "Comparison Ratio Limits" are considered to be in disagreement, while ratio values within or encompassed by the "Comparison Ratio Limits" are considered to be in agreement.

TABLE

NRC Confirmatory Measurements Acceptance Criteria
Resolution vs. Comparison Ratio Limits

Resolution	Comparison Ratio Limits for Agreement
< 4	0.4 - 2.5
4 - 7	0.5 - 2.0
8 - 15	0.6 - 1.66
16 - 50	0.75 - 1.33
51 - 200	0.80 - 1.25
> 200	0.85 - 1.18

[1]Comparison Ratio = $\frac{\text{Licensee Value}}{\text{NRC Reference Value}}$

[2]Resolution = $\frac{\text{NRC Reference Value}}{\text{Associated Uncertainty}}$