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

AUG 25 1989

Report No.: 50-261/89-14

Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, NC 27602

Docket No.: 50-261 License No.: DPR-23

Facility Name: H. B. Robinson

Inspection Conducted: July 31 - August 4, 1989

Inspector: Susan S. Adamovitz for C. A. Hughey 8/24/89 Date Signed

Accompanying Personnel: D. Seymour

Approved by: Susan S. Adamovitz for T. R. Decker, Chief 8/24/89 Date Signed
Radiological Effluents and Chemistry Section
Emergency Preparedness and Radiological Protection Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of radiological effluents , plant chemistry, and environmental monitoring.

Results:

In the areas inspected, violations or deviations were not identified.

The chemistry counting room quality control program was adequate in ensuring the accuracy of plant radiochemical measurements.

Plant chemistry had been generally maintained well within the guidelines recommended by the steam generator owner's group.

The environmental monitoring program appeared effective in assessing the impact of radiological releases to the environment.

Liquid and gaseous effluents were well within Technical Specifications, 10 CFR 20, and 10 CFR 50 effluent limitations for 1988.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*C. Dietz, Nuclear Project Manager
*J. Eaddy, Jr., Supervisor, Environmental and Chemistry (E&C)
*J. Harrison, Project Specialist, E&C
J. Hill, Technician I, E&C
C. Lowder, Technician I, E&C
*R. Morgan, Plant General Manager
W. Neeley, Senior Specialist, Corporate
*R. Smith, Manager, Environmental and Radiation Control
*H. Watkins, Foreman, E&C

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, security force members, technicians, and administrative personnel.

Nuclear Regulatory Commission

L. Garner, SRI
K. Jury, RI

*Attended exit interview

2. Radioactive Effluents (84750)

a. The licensee's counting room quality assurance (QA) program was reviewed by the inspector to ensure compliance with selected portions of Regulatory Guide 4.15, "QA for Radiochemical Monitoring Programs (Normal Operations) - Effluent Streams and the Environment," Revision (Rev.) 1, 1978. The following laboratory records were reviewed:

(1) Current efficiency calibration packages for all three intrinsic germanium detectors.

(2) Lower limit of detection verifications for gamma spectroscopy equipment.

(3) Source certificates for calibration sources.

(4) Current efficiency and resolution control charts for the gamma spectroscopy equipment.

(5) Daily performance checks for the Packard 460C Liquid Scintillation Spectrophotometer.

(6) Daily efficiency checks for the two LB/1000 Tennelec proportional counters.

b. The inspector randomly reviewed six waste release permits, all completed during 1989. All permits were properly completed and reviewed with no discrepancies noted.

3. Steam Cycle Chemistry (84750)

A review of chemistry data plots for the period January 1988 up to the time of the inspection, indicated that secondary chemistry had generally been maintained well within the guidelines recommended by the steam generator owners group (SGOG). During power operation, steam generator blowdown cation conductivity in all three steam generators averaged between 0.1 and 0.2 micromho/centimeter (umho/cm), well below the recommended Action 1 level of 0.8 umho/cm. Chloride, sulfate, and sodium concentrations in blowdown were consistently maintained well below the recommended Action 1 levels of 20 parts per billion (ppb) each, with sulfate concentrations averaging between 5 and 10 ppb, chloride concentrations between 2 and 8 ppb, and sodium concentration less than 2 ppb. Feedwater cation conductivity had been consistently maintained at about 0.o6 umho/cm, well below the recommended diagnostic limit of 0.2 umho/cm. Feedwater dissolved oxygen had been maintained less than 1 ppb. During power ascension at the beginning of the current fuel cycle, March 1989, limited hideout return had been noted to a maxium of about 50-60 ppb sulfates.

Periodic radiological analyses of the steam generator blowdown samples indicated very slight primary to secondary leakage during the current fuel cycle.

4. Reactor Coolant System Chemistry (84750)

The inspector reviewed trend plots of various reactor coolant system chemistry parameters. For the period March 1988 to present, which corresponded to the current fuel cycle, chloride concentrations had been consistently maintained below 20 ppb, which was well below Technical Specification (TS) limits. During 100 percent power steady state operations, dose equivalent Iodine-131 averaged about 7.0 E-04 microcuries per gram and the Iodine-131/Iodine-133 ratios averaged about 0.1. This indicated good fuel cladding integrity with very low fission product leakage into the reactor coolant, other than that expected from tramp uranium. Average reactor coolant gross activity for the period was about 2.0 E-01 microcuries per gram.

As discussed in Inspection Report No. 50-261/89-04 (January 30 through February 3, 1989), the licensee had previously initiated an elevated lithium control program in the reactor coolant system to reduce transport, deposition, and activation of corrosion products in the core. The purpose of this program was to reduce general dose rates around the plant.

During the current fuel cycle (13), the licensee had initiated further improvements in the program including a further increase of initial lithium levels in the reactor coolant system (RCS) to 3.35±0.5 parts per million (ppm). This increase would hopefully further reduce the general plant dose rate source term. Dose rate reduction had been noted during the last outage as the result of a limited RCS level increase during the previous fuel cycle (12).

5. Environmental Monitoring (84750)

The inspector examined selected offsite environmental monitoring sites and discussed the offsite environmental monitoring program with cognizant licensee representatives. This examination included five thermoluminescent (TLD) monitoring stations, three air sampling stations and one water sampling station. The stations appeared well maintained and the air samplers' integrated flow meters were within current calibration.

The annual Environmental Surveillance Report for January 1 through December 31, 1988, was reviewed. The program was conducted and reports submitted in accordance with TS requirements. This report concluded that the Robinson Nuclear Plant had minimal offiste radiological impact during 1988.

There were also no changes in the land use census, performed during May 1988, that would yield a higher potential offsite dose.

6. Service Water System (84750)

The inspector reviewed the water treatment program in place at Robinson for controlling and monitoring microbiological influenced corrosion (MIC). At the time of the inspection, the licensee had been chlorinating the service water system one hour per day with sodium hypochlorite. Measurements of free available chlorine residuals averaged 5 ppm. The licensee sampled and measured free floating bacteria levels as an indicator of effectiveness of the chlorination program. The licensee had developed criteria for the use and monitoring of a biodispersant. However, based on the positive results obtained with the service water chlorination program, these had not been implemented.

MIC and other corrosive processes were being monitored by the licensee in three ways. A plexiglass "biobox" simulated a worst-case service water environment and allowed the licensee to visually qualify system biofouling. A Deposit Accumulation Testing System (DATS) side stream monitor had been installed to monitor and measure fouling deposits by relating the amount of deposit to changes in heat transfer rates across a selected metal surface. The license had also installed a corrosion coupon rack. This coupon rack, installed on April 26, 1989, contained eight metal coupons representing a cross section of the materials contained in the Service Water System. These metals were copper, 90/10 copper, nickel, admirality brass, AL-6XN, AL-6X, AL-6X with a 625 weld, 316 stainless, and carbon steel. Periodically, the licensee removed these coupons and made

visual estimates of corrosion damage. The inspectors witnessed a visual inspection on August 3, 1989. Only the carbon steel coupon showed severe corrosive attack. The licensee planned on removing the coupons at some future date for quantitative analyses.

The licensee had also utilized equipment inspections to monitor the effectiveness of the service water chlorination programs. The inspector reviewed correspondence and photographs of plant equipment that documented "before" and "after" results of this program with the "before" pictures showing a greater accumulation of biofouling and corrosion.

Previous to this inspection, the licensee had replaced all service water piping in containment with AL-6X and AL-6XN high grade stainless steel. The inspector determined that the licensee had formulated plans for replacing service water piping outside of containment during an upcoming outage. Lastly, the licensee was in the process of developing layup procedures for key components of the service water system to prevent MIC in potential stagnant areas of the system. These procedures were to cover the layup of systems during outages and the layup of system components isolated during normal plant operation.

7. Semiannual Effluent Reports (84750)

The inspector reviewed the semiannual radioactive effluent reports for 1988. This review included an examination of the liquid and gaseous effluent data for 1988 as compared to the 1987 and 1986 data, and is summarized in Attachment 1 of this report.

Environmental monitoring procedure EMP-010, Effluent and Waste Disposal Report, Rev. 4, dated October 26, 1988, discussed the method for preparing the semiannual effluent reports. This procedure was complete and well organized.

Liquid fission and activation product discharges were well below the Region II average for 1988. Liquid tritium discharges for 1988, however, were slightly above the Region II average. This was attributable to the fact that Robinson does not recycle liquid radwaste for reuse in the plant. A comparison of liquid tritium and gross alpha discharges for 1988 to 1987, and 1986 data showed no significant trends. Liquid fission and activation products, however, did show slight increases during 1986, 1987, and 1988.

Gaseous fission and activation product releases were also well below the Region II average for 1988. This was attributed to good fuel integrity. Dose equivalent Iodine-131 values during the latest fuel cycle beginning in March 1989, indicated that this trend should continue. A comparison of gaseous iodine, particulate, and tritium discharges for 1988 to 1987, and 1986 data showed no significant trends. Fission and activation gases, however, showed slight increases over the period.

For 1988, Robinson liquid and gaseous effluents were well within TSs, 10 CFR 50, and 10 CFR 20 effluent limitations.

8. Non-Radiological Confirmatory Measurements (84750)

The inspector submitted a series of non-radiological chemistry samples to the licensee for analysis to assess the capability of the chemistry staff to perform acceptable analyses. These "unknowns" were prepared for the NRC by Brookhaven National Laboratory (BNL). The licensee diluted the samples, as directed by the inspector, to bring the concentrations to within the ranges normally observed in the condensate, feedwater, or reactor coolant and were then analyzed by three different chemists. The results were presented in Attachment 2.

9. Staffing

There had been no major changes in the Chemistry Department staff since the last inspection in this area. An upcoming company wide reorganization, however, could reuslt in significant changes and will be closely followed, in the future by the inspector.

10. Plant Tour

This inspection also included a informal tour of the plant site as an aide to inspector familiarization. As part of this tour, several plant systems were reviewed and the locations of several effluent monitors were identified. Overall, the inspector was impressed with the general housekeeping at the plant.

11. Exit Interview

The inspection scope and results were summarized on August 4, 1989, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed above. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

ATTACHMENT 1

RADIOACTIVE EFFLUENT RELEASE SUMMARY

H. B. ROBINSON

Abnormal Releases	1988	1987	1986
	0	0	1
a. Liquid			
1. Fission and Activation products	9.64E-01	9.36E-01	1.81E-01
2. Tritium	5.36E+02	2.47E+02	3.42E+02
3. Gross Alpha	<LLD	<LLD	<LLD
b. Gaseous			
1. Fission and Activation Gases	1.04E+03	7.70E+02	6.59E+02
2. Iodines	1.07E-03	2.08E-02	9.71E-03
3. Particulates	2.76E-05	1.56E-05	2.05E-04
4. Tritium	7.66E+00	1.39E-01	9.66E+00

ATTACHMENT 2

NON-RADIOLOGICAL COMPARISON RESULTS

H. B. ROBINSON

Analyte	Analysis Method	Dilution 1:X	NRC Value ±2 sigma (3 sigma)	Licensee Value	2 sigma Agreement	3 sigma Agreement
Fluoride						
87A	IC	1000	22.5 ± 4.1 (6.2)	20.0	A	A
87B	IC	1000	42.3 ± 3.6 (5.3)	37.8	D	A
87C	IC	1000	82.8 ± 7.0 (10.4)	76.9	A	A
Chloride						
87A	IC	1000	18.5 ± 1.4 (2.1)	19.0	A	A
87A	IC	1000	37.3 ± 2.4 (3.6)	39.4	A	A
87A	IC	1000	76.5 ± 6.3 (9.4)	83.6	D	A
Sulfate						
87A	IC	1000	19.5 ± 2.0 (2.9)	21.9	D	A
87A	IC	1000	38.3 ± 2.9 (4.4)	38.3	A	A
87A	IC	1000	78.0 ± 8.2 (12.4)	77.8	A	A
Boron						
87D	Titration	None	1040 ± 21 (31)	995	D	D
87E	Titration	None	3100 ± 62 (93)	2958	D	D
87F	Titration	None	5000 ± 120 (180)	4946	A	A
Ammonia						
87M	Spec.	1000	104 ± 10 (15)	109	A	A
87N	Spec.	1000	301 ± 29 (43)	297	A	A
87O	Spec.	1000	492 ± 46 (69)	498	A	A
Hydrazine						
87P	Spec.	1000	19.9 ± 0.6 (0.9)	22.1	D	D
87Q	Spec.	1000	49.9 ± 6.1 (9.1)	52.3	A	A
87R	Spec.	1000	100 ± 8 (12)	97.0	A	A
Silica						
87S	Spec.	1000	52.8 ± 7.8 (11.7)	45	A	A
87T	Spec.	1000	104 ± 8 (11.2)	87	D	D
87U	Spec.	1000	157 ± 9 (14.1)	136	D	D
Iron						
87G	AA	2000	18.6 ± 1.2 (1.8)	19.9	D	A
87H	AA	2000	39.8 ± 3.90 (5.9)	41.8	A	A
87I	AA	2000	58.5 ± 7.3 (10.9)	58.2	A	A