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

Report Nos.: 50-321/95-20 and 50-366/95-20

Licensee: Georgia Power Company
P. O. Box 1295
Birmingham, AL 35201

Docket Nos.: 50-321 and 50-366 License Nos.: DPR-57 and NPF-5

Facility Name: Hatch 1 and 2

Inspection Conducted: September 11-15, 1995

Inspector: I Wicker for DW Jones 10/13/95
D. W. Jones Date Signed

Approved by: I Wicker 10/13/95
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 confirmatory measurements and water chemistry control program.

Results:

In the areas inspected, no violations or deviations were identified.

The licensee demonstrated adequate capability to quantify radionuclide concentrations in various matrices normally encountered in nuclear power plant operations (Paragraph 2).

The licensee's chemistry control program was effectively implemented and in accordance with the Technical Specification and Technical Requirements Manual requirements. The licensee's procedures for ion chromatography analyses were consistent with the instrument vendor's manual for operation and maintenance of the instrument. The licensee had implemented good procedures and practices for assuring the quality of those analyses (Paragraph 3).

Enclosure

REPORT DETAILS

1. Persons Contacted

Licensee Employees

B. Arnold, Supervisor, Chemistry
*W. Flowers, Engineer, Safety Audit and Engineering Review
R. Garner, Senior Nuclear Chemistry Technician, Chemistry
†*W. Kirkley, Manager, Health Physics and Chemistry
*B. Knight, Nuclear Specialist, Health Physics and Chemistry
*S. Lee, Foreman, Chemistry
*V. McGowan, Supervisor, Chemistry
*T. Metzler, Acting Manager, Nuclear Safety and Compliance
†*D. Smith, Superintendent, Health Physics
*L. Sumner, General Manager

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

Nuclear Regulatory Commission

†J. Canady, Resident Inspector
†E. Christnot, Resident Inspector
*B. Holbrook, Senior Resident Inspector

†Attended entrance interview
*Attended exit interview

2. Confirmatory Measurements (84750)

10 CFR 20.1501 required the licensee to perform surveys as necessary to evaluate the extent of radiation levels, the concentrations or quantities of radioactive material, and the potential radiological hazards that could be present.

In an effort to evaluate the licensee's analytical capabilities, samples of reactor coolant, liquid radwaste, and main stack gaseous effluent were collected and analyzed for radionuclide concentrations by the licensee and the NRC Region II mobile laboratory. The inspector accompanied licensee personnel during the collection of the above samples and determined by direct observation that the samples were collected in accordance with the licensee's sampling procedures. A simulated particulate filter sample was prepared for analysis by spiking a filter with reactor coolant. The licensee was also provided with a spiked charcoal cartridge for analysis. The above samples were analyzed on the licensee's gamma spectroscopic systems and the licensee's analytical results were compared to the results obtained by the NRC mobile laboratory. A total of 49 comparisons of analytical results were made. The purpose of these measurement comparisons was to verify the licensee's capability to accurately detect and identify gamma emitting radionuclides and to quantify their concentrations. Attachment 1

provides a comparison of the licensee's results to the NRC's results for each sample. Attachment 2 provides the criteria for assessing the agreement between the analytical results. As indicated in Attachment 1, there was good agreement between the licensee's and the NRC's analytical results.

Based on the above comparisons, it was concluded that the licensee had demonstrated adequate capability to quantify radionuclide concentrations in various matrices normally encountered in nuclear power plant operations.

No violations or deviations were identified.

3. Water Chemistry Control Program (84750)

Technical Specifications (TSs) 3.4.6 and 3.7.6, and Sections 3.4.1 of the Technical Requirements Manuals (TRMs) for each unit described the operational and surveillance requirements for chloride concentration, conductivity, pH (Unit 1 only), and specific activity in the reactor coolant and for noble gas radioactivity rate in the main condenser off-gas prior to treatment. Operational limits for those attributes and sampling frequencies were specified for various operational conditions. Action statements applicable to specific operational modes were also provided for conditions in which the operational limits were exceeded.

The inspector reviewed procedure 64CH-ADM-001-0S, Revision (Rev). 11, "Chemistry Program" and determined that it included provisions for collecting and analyzing reactor coolant and pretreatment off-gas samples at the frequencies required by the TS and TRM. The procedure also identified specific sampling and analytical procedures which were to be used, the acceptance criteria for each attribute, and the actions to be initiated in the event that the acceptance criteria were exceeded.

The inspector also reviewed trend plots and tabulations of analytical results for the following parameters which were required by TS or TRM to be monitored: dose equivalent iodine-131 (DEI), chloride, and conductivity in reactor coolant; and the gross gamma radioactivity rate of the noble gases Xe-133, Xe-135, Xe-138, Kr-85m, Kr-87, and Kr-88 in the pretreatment off-gas. The data reviewed were generated during the period January through mid-September 1995 for both units. During steady state operations the coolant DEI was typically <5 E-5 μCi/ml for Unit 1 and <2 E-3 μCi/ml for Unit 2, which was within the TS limit of 0.2 μCi/gm. The coolant chloride concentrations for both units were typically <2 ppb which was well below the TRM limits of 200 ppb for Unit 1 and 500 ppb for Unit 2 during power operations. The coolant conductivity for both units was typically <0.1 μmho/cm and within the TRM limits of 2 μmho/cm for Unit 1 and 5 μmho/cm for Unit 2 during power operations. The gross gamma radioactivity rate of the noble gases Xe-133, Xe-135, Xe-138, Kr-85m, Kr-87, and Kr-88 in the pretreatment off-gas was referred to by the licensee as the "sum-of-six." The Unit 1 "sum-of-six" was typically <1000 μCi/sec which was well below the TS limit of 240,000 μCi/sec. The Unit 2 "sum-of-six" exhibited a

decreasing trend from ~7000 μCi/sec to <6000 μCi/sec. The elevated Unit 2 off-gas activity was a result of fuel leaks which had developed during the previous fuel cycle. The licensee indicated that the fuel assemblies which were suspected of having the leaking fuel rods were removed from the core during the last refueling outage.

The inspector performed a detailed review of the licensee's procedures and practices for the analysis of trace concentrations of chloride and sulfate in water samples. The licensee employed an ion chromatography analytical instrument in order to achieve the required sensitivity and reliability for measurements of ionic concentrations in the low (<5) ppb range. The inspection consisted of the following: review of the vendor's manual for operation and maintenance of the instrument, review of vendor technical notes for maintenance and reconditioning of the instrument's internal resin columns, review of the licensee's procedures for performing analyses and maintaining quality control (QC) of those analyses, review of analytical QC records, direct observation of operation of the instrument, and discussion of the analytical process with laboratory personnel. From that review, the inspector determined that the licensee's analytical procedure, 64CH-OCB-002-0S "Ion Determinations on the Dionex 2120i," was consistent with the vendors manual for operation of the instrument. The procedure also included provisions for blanking the instrument with reagent-grade water, calibration of the instrument, and measurement of standards for routine QC checks. Procedure 64CH-QCX-001-0S "Quality Control for Laboratory Analysis" included provisions for establishing control charts with control limits based on measurements of standards and for documenting and initiating investigation of routine QC check results exceeding control limits. The inspector reviewed the records for documenting the results from the routine quality control checks for chloride and sulfate analyses performed during June, July, and August 1995. The control charts used for plotting those results were also reviewed. From that review the inspector determined that the occurrences of QC check results exceeding the established control limits were documented and investigated in accordance with the above procedures. During discussion of the analytical process, laboratory personnel demonstrated for the inspector the following steps of the analytical procedure: blanking the instrument with reagent-grade water, preparation of a 5 ppb chloride standard for the routine QC check, and analysis of that standard. The inspector noted that the analytical procedure included provisions for subtracting ion concentrations in the reagent-grade water from analytical results for standards and unknown samples. The licensee indicated that as a matter of practice, the reagent-grade water is pumped through the instrument until the chloride concentration is at least less than 0.5 ppb and that their goal is to achieve a blank concentration of 0.1 ppb. If the 0.5 ppb blank concentration can not be achieved or if the 5 ppb QC check is not within the established control limits, one option for "trouble-shooting" the problem is to pump concentrated eluent through the instrument to recondition the resin columns. The licensee indicated that this problem occurs occasionally following analysis of samples with "relatively" high (50 ppb) chloride levels, such as suppression pool water samples. As indicated in the

paragraph above, the chloride levels in reactor coolant were typically <2 ppb. The inspector determined that the licensee's practice for removing residual contamination was consistent with the guidance provided by the vendor technical notes for maintenance and reconditioning of the instrument's internal resin columns. That guidance document indicated that the best clean-up procedure was to pump concentrated eluent through the instrument but did not specifically indicate whether the sample pump or the eluent pump should be used. The licensee indicated that instructions had been issued to laboratory personnel to use only the eluent pump when using concentrated eluent to clean-up the instrument. The "Standing Order" containing those instructions was reviewed by the inspector.

Based on the above reviews and discussions, it was concluded that the licensee's chemistry control program was effectively implemented and in accordance with the TS and TRM requirements. It was also concluded that the licensee's procedures for ion chromatography analyses were consistent with the instrument vendor's manual for operation and maintenance of the instrument. The licensee had implemented good procedures and practices for assuring the quality of those analyses.

No violations or deviations were identified.

4. Exit Interview

The inspection scope and results were summarized on September 15, 1995, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed above. No dissenting comments were received from the licensee. Proprietary information is not contained in this report.

COMPARISON OF NRC AND HATCH ANALYTICAL RESULTS
September 11-15, 1995

Type of Sample: Reactor Coolant - Unit 1

Sample Container: NRC 50 ml bottle
Hatch 50 ml bottle

Radio-nuclide	Licensee's Value	NRC Value	Reso-lution	Ratio	Comparison
Co-58	1.02E-04	8.81E-05 ± 7.71E-06	11	0.86	Agreement
Co-60	6.18E-05	5.50E-05 ± 7.10E-06	8	0.89	Agreement
Cs-134	9.40E-05	8.69E-05 ± 7.42E-06	12	0.92	Agreement
Cs-137	7.36E-05	4.56E-05 ± 9.02E-06	5	0.62	Agreement
I-131	6.85E-05	5.53E-05 ± 8.32E-06	7	0.81	Agreement
I-132	8.14E-04	9.60E-04 ± 8.32E-06	115	1.18	Agreement
I-133	2.33E-04	2.45E-04 ± 1.29E-05	19	1.05	Agreement
I-135	5.28E-04	5.40E-04 ± 3.77E-05	14	1.02	Agreement
Mn-54	9.99E-05	5.15E-05 ± 7.30E-06	7	0.52	Agreement
Na-24	7.86E-04	8.26E-04 ± 1.97E-05	42	1.05	Agreement
Sr-91	3.26E-04	3.69E-04 ± 3.05E-05	12	1.13	Agreement
Tc-99m	1.60E-04	2.05E-04 ± 7.02E-06	29	1.29	Agreement
Zn-65	6.20E-04	6.86E-04 ± 2.34E-05	29	1.11	Agreement

Type of Sample: Reactor Coolant - Unit 2

Sample Container: NRC 50 ml bottle
Hatch 50 ml bottle

Radio-nuclide	Licensee's Value	NRC Value	Reso-lution	Ratio	Comparison
Ba-140	2.44E-04	2.48E-04 ± 2.92E-05	8	1.02	Agreement
Co-58	1.19E-04	1.75E-04 ± 1.32E-05	13	1.47	Agreement
Co-60	1.39E-04	1.44E-04 ± 1.19E-05	12	1.04	Agreement
I-132	3.76e-03	3.76e-03 ± 9.21e-05	41	1.00	Agreement
I-133	1.41E-03	1.31E-03 ± 2.78E-05	47	0.93	Agreement
I-134	1.62E-02	1.32E-02 ± 1.24E-03	11	0.81	Agreement
I-135	3.79E-03	3.54E-03 ± 8.75E-05	40	0.93	Agreement
Mn-54	9.05E-05	8.45E-05 ± 1.04E-05	8	0.93	Agreement
Mo-99	9.61E-04	9.01E-04 ± 8.74E-05	10	0.94	Agreement
Na-24	3.60E-04	3.49E-04 ± 2.08E-05	17	0.97	Agreement
Sr-91	2.72E-03	2.72E-03 ± 7.23E-05	38	1.00	Agreement
Tc-99m	1.05E-03	1.24E-03 ± 2.69E-05	46	1.18	Agreement
Zn-65	8.94E-04	8.65E-04 ± 3.48E-05	25	0.97	Agreement

COMPARISON OF NRC AND HATCH ANALYTICAL RESULTS (CONT'D)

Type of Sample: Liquid Radwaste

Sample Container: NRC 1000 ml Marinelli beaker
Hatch 1000 ml Marinelli beaker

Radio-nuclide	Licensee's Value	NRC Value	Resolution	Ratio	Comparison
I-133	2.27E-07	2.00E-07 ± 3.42E-08	6	0.88	Agreement
Zn-65	2.81E-07	2.45E-07 ± 7.81E-08	3	0.87	Agreement

Type of Sample: Main Stack Gaseous Effluent

Sample Container: NRC 1000 ml Marinelli beaker
Hatch 1000 ml Marinelli beaker

Radio-nuclide	Licensee's Value	NRC Value	Resolution	Ratio	Comparison
Xe-133	6.43E-07	5.03E-07 ± 9.25E-08	5	0.78	Agreement
Xe-135	1.51E-07	1.14E-07 ± 2.51E-08	5	0.75	Agreement

Type of Sample: Particulate Filter

Radio-nuclide	Licensee's Value	NRC Value	Resolution	Ratio	Comparison
Ba-140	7.26E-06	7.28E-06 ± 5.04E-07	14	1.00	Agreement
Co-58	4.93E-06	4.47E-06 ± 2.39E-07	19	0.91	Agreement
Co-60	7.43E-06	7.47E-06 ± 2.51E-07	30	1.00	Agreement
Cr-51	4.00E-05	4.56E-05 ± 1.52E-06	30	1.14	Agreement
Fe-59	1.27E-05	1.20E-05 ± 4.43E-07	27	0.94	Agreement
La-140	3.52E-06	3.53E-06 ± 2.35E-07	15	1.00	Agreement
Mn-54	1.45E-05	1.28E-05 ± 2.80E-07	46	0.88	Agreement
Na-24	1.32E-06	1.84E-06 ± 2.61E-07	7	1.39	Agreement
Nb-95	1.21E-06	1.18E-06 ± 1.76E-07	7	0.98	Agreement
Sb-124	8.47E-07	6.80E-07 ± 1.17E-07	6	0.80	Agreement
Sr-91	1.60E-05	1.76E-05 ± 2.05E-06	9	1.10	Agreement
Tc-99m	2.09E-06	1.92E-06 ± 6.20E-07	3	0.92	Agreement

COMPARISON OF NRC AND HATCH ANALYTICAL RESULTS (CONT'D)

Type of Sample: Charcoal Cartridge

Radio-nuclide	Licensee's Value	NRC Value	Reso-lution	Ratio	Comparison
Cd-109	6.13E-01	5.49E-01 ± 5.47E-03	100	0.90	Agreement
Ce-139	8.52E-03	7.25E-03 ± 1.55E-04	47	0.85	Agreement
Co-57	1.73E-02	1.54E-02 ± 1.81E-04	85	0.89	Agreement
Co-60	1.92E-01	1.65E-01 ± 1.26E-03	131	0.86	Agreement
Cs-137	1.82E-01	1.53E-01 ± 9.94E-04	154	0.84	Agreement
Sn-113	2.04E-02	1.78E-02 ± 3.86E-04	46	0.87	Agreement
Y-88	3.44E-02	3.05E-02 ± 5.87E-04	52	0.89	Agreement

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 analyses, the measurement of the statistically random process of radioactive 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 or disagreement based 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 = $\frac{\text{NRC Reference Value}}{\text{Associated Uncertainty}}$