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

AUG 14 1992

Report No.: 50-395

Licensee: South Carolina Electric and Gas Company
Columbia, SC 29218

Docket No.: 50-395 License No.: NPF-12

Facility Name: V. C. Summer

Inspection Conducted: July 13-17, 1992

Inspector: _____ 8.11.92
D. A. Seymour Date Signed

Inspector: _____ 8.12.92
N. G. McNeill Date Signed

Approved by: _____ 8-14-92
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, unannounced inspection was conducted in the areas of radiological confirmatory measurements, the postaccident sampling system, and transportation of radioactive materials. The purpose of this inspection was to ensure that the licensee had adequate programs in place to effectively quantify the amounts of radioactive material released from the site in effluent releases and shipments of radioactive waste.

Results:

The audits performed to assess the adequacy and effectiveness of the quality assurance program for radiological effluent monitoring and shipping and transportation of radioactive materials and radwaste, were, in general, thorough, detailed, and well documented (Paragraph 2).

Plant personnel involved in the shipment of Radioactive Wastes were adequately trained in the procedures used in the shipment of the radioactive materials (Paragraph 3).

The licensee's procedures provided sufficient detail and guidance to allow technicians to properly package radioactive waste, classify the radioactive waste, and prepare the radioactive waste shipping manifest (Paragraph 4).

The tasks reviewed for a waste shipment performed during this inspection were handled in accordance with procedures and were correctly documented (Paragraph 5).

The Post Accident Sampling Program (PASS) was adequately implemented, maintained, and had adequate training provisions. The PASS system was well situated and shielded. The personnel involved in the routine sampling of RCS samples and atmospheric samples were knowledgeable of the operation of the system. Routine operability-testing of the system was performed and well documented (Paragraph 6).

One Inspector Follow-up item (IFI 92-15-01) was identified. This IFI will track the resolution of the differences between the licensee and South Carolina's Department of Health and Environmental Controls results for tritium in surface water (Paragraph 7).

A comparison of licensee and NRC results for radiological samples were in agreement for the sample streams analyzed. Based on a review of the quality control measures implemented in the count room, it was concluded that the overall operability of the detectors was satisfactory (Paragraph 8).

Licensee Event Report 91-002 (failure to set the alarm/trip setpoints of the Turbine Building Sump radiation monitor in accordance with the Offsite Dose Calculation Manual) was closed (Paragraph 9).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Baehr, Manager, Chemistry and Health Physics
*W. Bacon, Associate Manager, Chemistry
*L. Blue, Manager, Corporate Health Physics and Environmental Programs
*J. Dinkins, Environmental Services Operations
L. Faultus, Supervisor, Radiochemistry
*G. Gowdy, Staff Health Physicist
*G. Guy, Superintendent, Radwaste Programs
*G. Hall, Associate Manager, Health Physics
*M. Jordan, Supervisor, Health Physics
*W. Higgins, Acting Manager, Nuclear Licensing and Operating Experience
*S. Hunt, Acting General Manager, Nuclear Safety
S. Kincaid, Coordinator, Radiological Wastes
*A. Koon, Jr., Project Coordinator, Nuclear Operations Department
J. Knox, Supervisor, Training
*C. McKinney, Licensing
*K. Nettles, General Manager, Station Support
*J. Schafer, Supervisor, Health Physics
*J. Skolds, Vice President, Nuclear Operations
*J. Sowell, Health Physics
*G. Taylor, General Manager, Nuclear Plant Operations

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

*Attended exit interview

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

2. Audits (84750)

Technical Specifications (TS) 6.5.2.8(k), (l) and (m) require the Nuclear Safety Review Committee to audit the Radiological Environmental Monitoring Program, the ODCM, and the Process Control Program, at least once every 12, 24 and 24 months, respectively. The audits are performed in order to verify that these programs are being effectively implemented, and are in accordance with regulatory requirements.

The inspector reviewed the following audit and surveillance reports:

* Surveillance Report 17-RFM-90-R "Observe Radwaste Activity"

* Surveillance Report 13-CCW-92-R "Process Control Program for Processing Wet Waste"

* Surveillance Report 05-BEM-92-R "Radwaste Shipment Per HPP-703"

* Audit Report Radioactive Waste Program, February 13 26, 1991

The above audits assessed the adequacy and effectiveness of the quality assurance program for radiological effluent monitoring and shipping and transportation of radioactive materials and radwaste. In general the audits were thorough, detailed, and well documented. Although the audits identified some program weaknesses, licensee management made adequate commitments to correct the few deficiencies identified.

No violations or deviations were identified.

3. Training and Qualification (86750)

TSs 6.3.1 and 6.4.1 require the licensee to maintain a training program for the plant staff to assure that the minimum education and experience requirements of Section 5.5 of ANSI/ANS-3.1-1978 and Appendix "A" of 10 CFR 55 and the supplemental requirements specified in Section A and C of Enclosure 1 of the March 28, 1980 NRC letter to all licensees are met before a person can be considered to be qualified to perform his duties independently. The program shall include familiarization with the relevant operational experience.

The training records of several of the persons involved in the shipment of Radioactive Waste in general and in particular those involved in the shipment of a High Integrity Container (HIC) to the Barnwell site were examined in detail. The records of the personnel as maintained by the Training Department were current and up to date, and activities as related to employee qualifications were well maintained. The Training Department had implemented a new system which enables the ready access to the qualification records of any person working for V. C. Summer.

This review indicated that plant personnel involved in the shipment of radioactive wastes were adequately trained in the procedures used for the shipment of radioactive waste.

No violations or deviations were identified.

4. Solid Radioactive Waste Management (86750)

10 CFR 20.311 requires a licensee who transfers radioactive waste to a land disposal facility to prepare all waste so that the waste is classified in accordance with 10 CFR 61.55 and meets the waste characteristics requirements of 10 CFR 61.56. It further establishes specific requirements for conducting a quality control program and for maintaining a manifest tracking system for all shipments.

The inspector reviewed the licensee's solid radioactive waste management program for wastes generated from the V.C. Summer Nuclear Station operations. The review included the following: adequacy of implementing procedures to classiry and characterize the wastes; preparation of the manifest and marking packages; overall performance of the process control and quality control programs; and the adequacy of required records, reports, and notifications. In addition the inspector reviewed the methods used by the licensee to assure that the waste was classified properly, met the waste form and characteristic requirements of 10 CFR 61, and met the disposal site license criteria.

This review indicated that the licensee's procedures provided sufficient detail and guidance to allow technicians to properly package radioactive waste, classify the radioactive waste, and prepare the radioactive waste shipping manifest.

No violations or deviations were identified.

5. Shipping of Low Level Wastes for Disposal, and Transportation (86750)

10 CFR 20.311 (b) requires each shipment of radioactive waste to a land disposal facility to be accompanied by a shipment manifest that indicates as completely as practicable; a physical description of the waste, the volume, the radionuclide identity and quantity, the total radioactivity, and the principal chemical form.

10 CFR 71.5 requires that licensees who transport licensed material outside the confines of it's plant or other place of use,or who deliver licensed material to a carrier for transport, shall comply with the applicable requirements of the regulations appropriate to the mode of transport of the

Department of Transportation (DOT) in 49 CFR Parts 170 through 189.

49 CFR 172.203 (d) (i) requires, in part, that a shipping paper contain a 24-hour emergency number, as prescribed in subpart G of Part 172 of this subchapter.

The inspector observed the shipment of dewatered resins in a HIC which was bound for the Barnwell burial site in South Carolina. This included the arrival of the Type B shipping cask on site from Chem-Nuclear System, Inc. (CNS) as well as activities relevant to the shipment; and concluded with the release of the shipment offsite. The inspector reviewed the records of radioactive waste which were prepared prior to the shipment. The shipping manifest examined was consistent with the DOT requirements. The radiation and contamination survey results were within the limits specified for the mode of transport and shipment classification; and the shipping documents were complete and maintained as required. The inspector also verified that the NRC-certified shipping cask Certificate of Compliance was current.

The inspector also reviewed the waste shipment manifest to determine compliance with the 24-hour emergency telephone requirements specified in 49 CFR 172.203 (d). The inspector called the number while the cask was in transit to the burial site and noted that the telephone number reached the Control Room. The Control Room Shift Supervisor was able to answer relevant questions concerning the shipment and was cognizant of the actions necessary in the event of a transportation emergency.

Based on this review, the inspector concluded that this shipment was handled according to procedure and included the correct documentation.

No violations or deviations were identified.

6. Post Accident Sampling System (PASS) Capabilities (84750)

NUREG-0737, Criterion 2a provides specifications for the establishment of onsite radiological analysis capabilities to provide quantification of noble gases, iodines, and non-volatile radionuclides in the reactor coolant system (RCS) and containment atmosphere. The PASS should provide these capabilities, and should enable the licensee to obtain information critical to the efforts to assess and control the course and the effects of an accident.

Pursuant to these specifications, the inspector reviewed selected procedures for the operation, maintenance, and testing of the PASS. The inspector also reviewed the

physical layout of the PASS sampling stations, training, and capabilities of the system.

The inspector reviewed the following procedures:

* Health Physics Procedures (HPP);

  HPP-920 Post Accident Sampling System Quarterly Check

  HPP-920 Post Accident Reactor Building Atmospheric Sampling, Revision 6

* Chemistry Procedures (CP);

  CP-903 Operation of the Nuclear Sample System under Normal and Post Accident Conditions

  CP-906 Post Accident Sample System Preventative Maintenance and Sample Comparison Program

Technical Specification 6.8.4.d states the requirements for the PASS system in regards to training, sampling and analysis, and the provisions for the maintenance of the sampling and analysis equipment.

The inspector considered the PASS program to be adequately implemented and maintained; and to have adequate training provisions. The PASS system and well situated and shielded. While no PASS samples were obtained at the time of the inspection, the personnel involved in the routine sampling of RCS samples, as well as atmospheric samples, were knowledgeable of the operation of the system. In addition, routine operability-testing of the system was performed and well documented.

No violations or deviations were identified.

7. Radiological Environmental Monitoring Program (REMP), (84750)

Technical Specification (TS) 6.8.4.f requires that the REMP be established, implemented, and maintained. The REMP provides for means of monitoring the radiation and radionuclides in the environs of the plant. The program shall provide for representative measurements of radioactivity in the highest exposure pathways. The program is required to include monitoring, sampling, analysis and reporting of radiation and radionuclides in the environment in accordance with the methodology and parameters in the Offsite Dose Calculation Manual; and participation in an Inter-Laboratory Comparison Program. This ensures that independent checks on the precision and accuracy of the

radiological measurements are performed as part of the quality assurance program for the REMP.

Pursuant to these requirements, the inspector reviewed the South Carolina Department of Health and Environmental Controls' (DHEC) Nuclear Facility Monitoring Report for 1991. This document reports data for radiological environmental surveillances for the environs of the plant; and includes data for samples of surface water, air, milk, fish, vegetation and sediment. The State of South Carolina DHEC analyzed split or duplicate samples with V. C Summer for these media for several locations.

The inspector determined that there were no significant differences between DHEC's values and the licensee's values for the split or duplicate samples for these media; except for the results for tritium in surface water. The inspector reviewed these results, and discussed these differences with the licensee and with a DHEC representative. One example of these differences for tritium in surface water for a split sample was 1750 picocuries per liter (DHEC) compared to less than 477 picocuries per liter (licensee). All of the values listed (licensee and DHEC) in the DHEC report were well below the reporting level of 20000 picocuries tritium per liter.

The licensee committed to determining the cause of the differences between their and the DHEC's values for tritium in surface water. The resolution of these differences will be tracked as a Inspector Follow-up Item (IFI 92-15-01).

There were no other findings identified in this area.

8. Confirmatory Measurements (84750)

10 CFR 20.201(b) requires the licensee to perform surveys as necessary to evaluate the extent of radiation hazards.

The licensee uses measurements of effluent streams to assess doses to the public resulting from the operation of the plant. In order for the licensee to assess the doses to the public accurately, it is imperative that the measurements of the different effluent streams be representative and accurate.

Pursuant to these requirements, the inspector evaluated the licensee's analytical capabilities to make accurate radioactivity measurements. During this inspection, samples of reactor coolant and selected liquid and gaseous process streams were collected and the resultant sample matrices were analyzed for radionuclide concentrations using the licensee's counting laboratory and the NRC Region II mobile laboratory gamma spectroscopy system. The purpose of these comparative

measurements was to verify the licensee's capability to measure quantities of radionuclides accurately in various plant systems.

Analyses were conducted using the licensee's four intrinsic germanium gamma spectroscopy systems. Sample types included the following:

a. reactor coolant;
b. liquid waste (waste monitor tank);
c. gaseous waste (waste gas decay tank);
d. airborne particulate (filtered reactor coolant);
e. a spiked charcoal cartridge (provided by the NRC).

A comparison of licensee and NRC results are listed in Attachment 1, Table 1 with the acceptance criteria listed in Attachment 2. The results were in agreement for the sample streams analyzed.

As part of the confirmatory measurements inspection, the inspector also reviewed the licensee's Quality Assurance Program for their gamma spectrometers. The following observations were made:

1) Energy, efficiency, and full-width half max (resolution) determinations were performed daily. The values obtained were recorded and trended on control charts with predetermined limits in order to determine detector stability and operability.

2) A thirty minute background count was performed weekly to verify lower limits of detection.

The inspector also reviewed the daily checks performed on the gross alpha and beta counters used in the count room. No discrepancies were noted. Based on this review, the inspector concluded that the overall operability of the detectors was satisfactory.

No violations or deviations were identified.

9. Licensee Event Report (LER 91-002)

Paragraph 6 of Inspection Report 50-395/92-14 detailed an inspector's review of a licensee-identified technical specification noncompliance involving the Turbine Building Sump radiation monitor. A non-cited violation was issued for failure to set the alarm/trip setpoints of the Turbine Building radiation monitor in accordance with the ODCM. Based on the review of this incident, as detailed in Inspection Report 50-395/92-14, LER 91-002 is considered closed.

10. Exit Interview

The inspection scope and results were summarized on July 17, 1992 with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results as listed in the summary. One Inspector Follow-up item was identified. This IFI will track the resolution of the differences between the licensee and South Carolina's Department of Health and Environmental Control results for tritium in surface water (Paragraph 7). Licensee Event Report 91-002 (failure to set the alarm/trip setpoints of the Turbine Building Sump radiation monitor in accordance with the Offsite Dose Calculation Manual) was closed (Paragraph 9). Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Attachment 1

V. C. Summer, July 1992
NRC-LICENSEE SAMPLE COMPARISON DATA

CP-100 Charcoal Cartridge NRC CC 011

Isotope	Licensee Value	NRC Value	Error	Resolution	Ratio	Agreement
Detector #1						
CD-109	3.12E-01	3.82E-01	+- 1.09E-02	35	0.82	Agreement
CE-139	1.74E-03	1.68E-03	+- 8.72E-05	19	1.04	Agreement
CO-57	4.86E-03	5.23E-03	+- 1.81E-04	29	0.93	Agreement
CO-60	4.22E-02	4.27E-02	+- 1.49E-03	29	0.99	Agreement
CS-137	4.59E-02	4.70E-02	+- 2.08E-03	23	0.98	Agreement
SN-113	2.08E-03	2.22E-03	+- 1.96E-04	11	0.94	Agreement
Y-88	2.67E-03	2.57E-03	+- 2.52E-04	10	1.04	Agreement
Detector #4						
CD-109	3.06E-01	3.82E-01	+- 1.09E-02	35	0.80	Agreement
CE-139	1.74E-03	1.68E-03	+- 8.72E-05	19	1.04	Agreement
CO-57	4.82E-03	5.23E-03	+- 1.81E-04	29	0.92	Agreement
CO-60	4.12E-02	4.27E-02	+- 1.49E-03	29	0.96	Agreement
CS-137	4.48E-02	4.70E-02	+- 2.08E-03	23	0.95	Agreement
SN-113	2.12E-03	2.22E-03	+- 1.96E-04	11	0.95	Agreement
Y-88	2.59E-03	2.57E-03	+- 2.52E-04	10	1.01	Agreement
Detector #5						
CD-109	3.16E-01	3.82E-01	+- 1.09E-02	35	0.83	Agreement
CE-139	1.81E-03	1.68E-03	+- 8.72E-05	19	1.08	Agreement
CO-57	4.89E-03	5.23E-03	+- 1.81E-04	29	0.93	Agreement
CO-60	4.19E-02	4.27E-02	+- 1.49E-03	29	0.98	Agreement
CS-137	4.54E-02	4.70E-02	+- 2.08E-03	23	0.97	Agreement
SN-113	1.98E-03	2.22E-03	+- 1.96E-04	11	0.89	Agreement
Y-88	2.70E-03	2.57E-03	+- 2.52E-04	10	1.05	Agreement
Detector #8						
CD-109	3.08E-01	3.82E-01	+- 1.09E-02	35	0.81	Agreement
CE-139	1.77E-03	1.68E-03	+- 8.72E-05	19	1.05	Agreement
CO-57	4.72E-03	5.23E-03	+- 1.81E-04	29	1.04	Agreement
CO-60	4.13E-02	4.27E-02	+- 1.49E-03	29	0.97	Agreement
CS-137	4.62E-02	4.70E-02	+- 2.08E-03	23	0.98	Agreement
SN-113	2.11E-03	2.22E-03	+- 1.96E-04	11	0.95	Agreement
Y-88	2.53E-03	2.57E-03	+- 2.52E-04	10	0.98	Agreement

Reactor Coolant Sample

Isotope	Licensee Value	NRC Value	Error	Resolution	Ratio	Agreement
Detector #1						
I-131	1.33E-02	1.21E-02	+- 9.56E-04	13	1.10	Agreement
I-132	1.94E-02	2.30E-02	+- 1.31E-03	18	0.84	Agreement
I-133	1.48E-02	1.53E-02	+- 8.23E-04	19	0.97	Agreement
I-134	3.31E-02	3.81E-02	+- 1.46E-03	29	0.87	Agreement
I-135	2.05E-02	2.32E-02	+- 1.37E-03	17	0.88	Agreement
NA-24	3.01E-02	3.08E-02	+- 1.13E-03	27	0.98	Agreement
Detector #5						
I-131	1.27E-02	1.21E-02	+- 9.56E-04	13	1.05	Agreement
I-132	1.95E-02	2.30E-02	+- 1.31E-03	18	0.85	Agreement
I-133	1.47E-02	1.53E-02	+- 8.23E-04	19	0.96	Agreement
I-134	3.37E-02	3.81E-02	+- 1.46E-03	29	0.88	Agreement
I-135	2.13E-02	2.32E-02	+- 1.37E-03	17	0.92	Agreement
NA-24	2.96E-02	3.08E-02	+- 1.13E-03	27	0.96	Agreement
Detector #8						
I-131	1.33E-02	1.21E-02	+- 9.56E-04	13	1.10	Agreement
I-132	1.93E-02	2.30E-02	+- 1.31E-03	18	0.84	Agreement
I-133	1.52E-02	1.53E-02	+- 8.23E-04	19	0.99	Agreement
I-134	3.11E-02	3.81E-02	+- 1.46E-03	29	0.82	Agreement
I-135	2.05E-02	2.32E-02	+- 1.37E-03	17	0.88	Agreement
NA-24	2.95E-02	3.08E-02	+- 1.13E-03	27	0.96	Agreement

Detector #4 -- not calibrated for this geometry

Waste Gas Decay Tank

Isotope	Licensee Value	NRC Value	Error	Resolution	Ratio	Agreement
Detector #1						
KR-85M	6.14E-02	5.49E-02	+- 1.89E-03	29	1.11	Agreement
KR-87	9.08E-03	1.05E-02	+- 6.24E-04	17	0.86	Agreement
KR-88	5.38E-02	4.48E-02	+- 1.59E-03	28	1.20	Agreement
XE-133	3.24E+00	3.60E+00	+- 1.04E-01	35	0.90	Agreement
XE-133M	5.88E-02	4.72E-02	+- 2.03E-03	23	1.24	Agreement
XE-135	5.38E-01	4.58E-01	+- 1.48E-02	31	1.17	Agreement
Detector #4						
KR-85M	6.42E-02	5.49E-02	+- 1.89E-03	29	1.17	Agreement
KR-87	1.02E-02	1.05E-02	+- 6.24E-04	17	0.97	Agreement
KR-88	5.63E-02	4.48E-02	+- 1.59E-03	28	1.26	Agreement
XE-133	3.51E+00	3.60E+00	+- 1.04E-01	35	0.98	Agreement
XE-133M	6.20E-02	4.72E-02	+- 2.03E-03	23	1.31	Agreement
XE-135	5.83E-01	4.58E-01	+- 1.48E-02	31	1.27	Agreement
Detector #5 - not calibrated for this geometry						
Detector #8						
KR-85M	6.47E-02	5.49E-02	+- 1.89E-03	29	1.18	Agreement
KR-87	1.09E-02	1.05E-02	+- 6.24E-04	17	1.04	Agreement
KR-88	5.81E-02	4.48E-02	+- 1.59E-03	28	1.30	Agreement
XE-133	3.41E+00	3.60E+00	+- 1.04E-01	35	0.95	Agreement
XE-133M	6.20E-02	4.72E-02	+- 2.03E-03	23	1.31	Agreement
XE-135	5.87E-01	4.58E-01	+- 1.48E-02	31	1.28	Agreement

Particulate Filter

Isotope	Licensee Value	NRC Value	Error	Resolution	Ratio	Agreement
Detector #1						
CS-134	3.26E-03	3.25E-03	+- 1.96E-04	17	1.00	Agreement
CS-137	1.06E-02	9.10E-03	+- 4.62E-04	20	1.16	Agreement
I-131	1.07E-03	1.12E-03	+- 1.19E-04	9	0.96	Agreement
I-133	1.05E-03	1.19E-03	+- 1.24E-04	10	0.92	Agreement
NA-24	4.69E-02	3.98E-02	+- 1.39E-03	29	1.18	Agreement
Detector #4						
CS-134	3.14E-03	3.25E-03	+- 1.96E-04	17	0.97	Agreement
CS-137	1.07E-02	9.10E-03	+- 4.62E-04	20	1.18	Agreement
I-131	1.16E-03	1.12E-03	+- 1.19E-04	9	1.04	Agreement
I-133	1.27E-03	1.19E-03	+- 1.24E-04	10	1.07	Agreement
NA-24	4.72E-02	3.98E-02	+- 1.39E-03	29	1.19	Agreement
Detector #5						
CS-134	3.55E-03	3.25E-03	+- 1.96E-04	17	1.09	Agreement
CS-137	1.08E-03	9.10E-03	+- 4.62E-04	20	1.19	Agreement
I-131	1.11E-03	1.12E-03	+- 1.19E-04	9	0.99	Agreement
I-133	1.08E-03	1.19E-03	+- 1.24E-04	10	0.91	Agreement
NA-24	4.61E-02	3.98E-02	+- 1.39E-03	29	1.16	Agreement
Detector #8						
CS-134	3.43E-03	3.25E-03	+- 1.96E-04	17	1.06	Agreement
CS-137	1.02E-02	9.10E-03	+- 4.62E-04	20	1.12	Agreement
I-131	1.05E-03	1.12E-03	+- 1.19E-04	9	0.94	Agreement
I-133	9.68E-04	1.19E-03	+- 1.24E-04	10	0.81	Agreement
NA-24	4.39E-02	3.98E-02	+- 1.39E-03	29	1.10	Agreement

Waste Monitor Tank

Isotope	Licensee Value	NRC Value	Error	Resolution	Ratio	Agreement
Detector #1						
CO-58	1.63E-06	1.59E-06	+- 1.35E-07	12	1.03	Agreement
CO-60	5.42E-06	5.45E-06	+- 2.95E-07	18	0.99	Agreement
CS-134	1.68E-06	1.13E-06	+- 1.19E-07	9	1.49	Agreement
CS-137	3.14E-06	2.45E-06	+- 1.89E-07	13	1.28	Agreement
MN-54	3.34E-07	3.49E-07	+- 8.19E-08	4	0.96	Agreement
Detector #4						
CO-58	1.32E-06	1.59E-06	+- 1.35E-07	12	0.83	Agreement
CO-60	5.49E-06	5.45E-06	+- 2.95E-07	18	1.01	Agreement
CS-134	1.45E-06	1.13E-06	+- 1.19E-07	9	1.28	Agreement
CS-137	2.81E-06	2.45E-06	+- 1.89E-07	13	1.15	Agreement
MN-54	3.65E-07	3.49E-07	+- 8.19E-08	4	1.05	Agreement
Detector #5						
CO-58	1.47E-06	1.59E-06	+- 1.35E-07	12	0.92	Agreement
CO-60	5.13E-06	5.45E-06	+- 2.95E-07	18	0.94	Agreement
CS-134	1.52E-06	1.13E-06	+- 1.19E-07	9	1.35	Agreement
CS-137	2.74E-06	2.45E-06	+- 1.89E-07	13	1.12	Agreement
MN-54	4.15E-07	3.49E-07	+- 8.19E-08	4	1.19	Agreement
Detector #8						
CO-58	1.64E-06	1.59E-06	+- 1.35E-07	12	1.03	Agreement
CO-60	5.66E-06	5.45E-06	+- 2.95E-07	18	1.04	Agreement
CS-134	1.55E-06	1.13E-06	+- 1.19E-07	9	1.37	Agreement
CS-137	2.63E-06	2.45E-06	+- 1.89E-07	13	1.07	Agreement
MN-54	4.73E-07	3.49E-07	+- 8.19E-08	4	1.36	Agreement

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 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 = $\frac{\text{NRC Reference Value}}{\text{Associated Uncertainty}}$