



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

NOV 29 1982

Report No. 50-369/82-40

Licensee: Duke Power Company

Facility Name: McGuire Unit 1

Docket No. 50-369

License No. NPF-9

Inspection at McGuire site near Lake Norman, N. C.

Inspector: C. D. Evans 11-24-82
Date Signed

Accompanying Personnel: P. C. McPhail

Approved by: D. M. Montgomery 11/24/82
Date Signed
 D. M. Montgomery, Section Chief
 Independent Measurements and
 Environmental Protection Section
 Division of Emergency Preparedness
 and Operational Support

SUMMARY

Inspection on November 8-12, 1982

Areas Inspected

This routine, unannounced inspection involved 49 inspector-hours on site in the areas of quality control and confirmatory measurements including: review of the laboratory quality control program; review of chemical and radiochemical procedures; airborne effluent sampling methodology; and comparison of the results of split samples analyzed by the licensee and the NRC Region II Mobile Laboratory.

Results

Of the four areas inspected, no violations or deviations were identified in four areas.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *M. D. McIntosh, Station Manager
- *T. Z. McConnell, Superintendent of Technical Services
- *J. W. Foster, Health Physics Coordinator
- *W. F. Byrum, Health Physics - Countroom Supervisor
- *T. J. Wall, Radwaste Coordinator
- *M. Sample, Projects - Licensing
- R. C. Futrell, Chairman NSRB, Duke Corporate Office
- J. M. Frye, Senior Quality Assurance Supervisor, Duke Corporate Office

Other licensee employees contacted included three technicians.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on November 12, 1982, with those persons indicated in paragraph 1 above.

3. Unresolved Items

Unresolved items were not identified during this inspection.

4. Laboratory Quality Control Program

The inspector reviewed the licensee quality assurance program in chemistry and radiochemistry. Technical Specification 6.8 requires that written procedures shall be established, implemented and maintained covering the quality assurance program for effluent and environmental monitoring using the guidance contained in Regulatory Guide 4.15, December 1977. The licensee's program was reviewed to verify compliance with the following elements as specified in Regulatory Guide 4.15:

a. Organizational Structure and Responsibilities of Managerial and Operational Personnel

The Station Health Physicist has the overall responsibility for radiological measurements. The operation of the quality control program for radiological measurements on a day-to-day basis has been delegated to the Health Physics Supervisor-Support Function. The responsibility for the Chemistry Quality Control program rests with the Station Chemist. The operation of the chemistry quality control programs on a day-to-day basis has been delegated to the Radwaste Chemistry and Power Chemistry Coordinators in their respective areas of responsibility.

b. Specification of Qualifications of Personnel

The qualification requirements of staff members involved in radiological monitoring activities are given in the McGuire Station position guides. Detailed position guides for the supervisory positions include a description of duties and qualifications. Position descriptions are also available for the various categories of health physics technicians.

c. Operating Procedures and Instructions

The inspector verified that written procedures have been established and implemented for activities involved in effluent monitoring and chemical analyses including sample collection, operation and calibration of instrumentation, and quality control checks. Procedures include acceptance criteria for instrument performance checks and corrective action.

d. Records

The inspector verified that the operating procedures provide for the documentation of activities including records of sample collection, analysis and reporting. Records of the calibration program and quality control checks are required by the operating procedures.

e. Quality Control in Sampling

The inspector verified that procedures for collection of liquid and gaseous samples have been implemented. The inspector noted that there was no calibration program for the sample air flow measurement devices associated with the Unit 1 plant vent and containment purge sampling systems as recommended in Regulatory Guide 4.15. Licensee representatives stated that they would evaluate the need for a calibration program of the effluent gaseous sampling flow measurement devices. This will be carried as an inspector followup item and reviewed during a subsequent inspection (50-369/82-40-01).

f. Quality Control in the Radioanalytical Laboratory

The inspector determined from a review of the Health Physics procedure series HP/O/B/1001 10-17 for calibration and quality assurance of countroom instrumentation that the licensee's laboratory quality control program meets the basic requirements set forth in Regulatory Guide 4.15 including: use of NBS traceable radionuclide reference standards, performance checks of radiation measurement systems, and an interlaboratory crosscheck program.

The Duke Environmental Radiological Laboratory has been delegated the responsibility for administering the Interstation Cross-check Program. The program consist of scheduled "unknowns" which are distributed to the different stations. The acceptance criteria is based on a normalized range calculated from the results of all the participating

stations. The inspector noted that the issuance of gamma emitting unknowns for isotopic analysis were not frequent enough to insure the confidence in the accuracy of the station's radioanalytical measurements. Licensee representatives stated that they would consider the need for increasing the number of gamma emitting unknowns. This will be carried as an inspector followup item and reviewed during a subsequent inspection (50-369/82-40-02).

g. Review, Analysis, and Reporting Data

Radiochemistry and Chemistry operating procedures provide for review of analytical results by supervisory personnel. Operating procedures provide for acceptance criteria for performance checks and corrective action, if necessary.

h. Audits

The Corporate Quality Assurance Department, Audit Division, is required to perform periodic audits of the health physics and chemistry programs in accordance with procedure QA-210. These periodic audits include review of documents, records, work activities in progress, and plant conditions for the purpose of verifying compliance with applicable procedures and regulatory requirements. In addition, the Corporate Health Physics Organization conducts an annual audit of the plant health physics organization. The inspector verified that within the scope of this audit are elements which would fulfill the requirement of Technical Specification 6.5.2.8, providing for an annual audit of activities required by the Quality Assurance Program to meet the criteria of Regulatory Guide 4.15.

5. Review of Procedures and Records

The inspector reviewed the procedures and records listed below.

a. Procedures

1. HP/O/B/1001/14, "Calibration and Quality Assurance for the Manual Liquid Scintillation Counter", 6-18-81.
2. HP/O/B/1001/17, "Calibration and Quality Assurance for the Tennelec LB 5100", 3-9-82.
3. HP/O/B/1001/10, "Calibration and Quality Assurance for the ND 6600 Geli System", 2-27-81.
4. HP/O/B/1001/13, "Calibration and Quality Assurance of the Prias Liquid Scintillation System", 5-20-82.
5. CP/O/B/8100/31, "The Analysis of Gas Mixtures of Hydrogen, Oxygen, and Nitrogen", 12-3-82.

6. CP/O/B/8100/05, "The Determination of Boron in Aqueous Boric Acid Solutions", 5-19-82.
 7. CP/O/B/8100/06, "The Determination of Chloride in High Purity Water", 10-19-79.
 8. HP/O/B/1003/07, "Preparation of Countroom Standards", 8-21-82.
 9. HP/O/B/1003/03, "Radioactive Gaseous Waste Release", 6-29-82.
 10. Health Physics Manual Section (HPMS) 12.1, "Operating Procedure for ND 6600".
 11. HPMS 13.6, "Composite Sampling".
 12. HPMS 8.4, "Unit Vent and Waste Gas Tech. Spec. Routine Air Sampling".
 13. Chemical Manual (CM) 3.11, "Chemical Data Quality Control".
 14. CM 3.8, "McGuire Nuclear Station Chemistry Specifications", 10-23-82.
 15. HP/O/B/1001/08, "Quality Assurance and Sample Traceability", 6-8-81.
- b. Records
1. Calibrations Records: 100 cc. gas chamber, 4.5 L. gas marinelli, 3 L. liquid marinelli, charcoal cartridge, particulate filter, 1982.
 2. Ge(Li) Daily Performance Checks, 1982.
 3. Prias Liquid Scintillation Counter Performance Checks, 1982.
 4. Standardization checks for Boron, Chloride, and Flouride analyses; September 1 - November 8, 1982.
 5. Plant vent daily charcoal and particulate gamma scans; October 1 - November 8, 1982.
 6. Plant vent monthly gas gamma scan; October 1982.
 7. Health Physics Program Review, File (MC-750.05), April 15, 1982.
 8. Departmental Audits SP-82-11 (60) and SP-82-6 (MC)
- The review of procedures and records are discussed in paragraphs 5c-5e.

- c. The inspector noted that procedure HP/O/B/1003/03, "Radioactive Gaseous Waste Release", did not provide for removal of noble gas from the tritium impinger sample before counting by liquid scintillation. This may result in overestimation of tritium releases. Licensee representatives stated that they have not experienced significant releases of gaseous tritium, but would evaluate the need for removal of noble gas gases from the tritium impinger sample and revise the procedure as necessary. This item will be reviewed in a subsequent inspection (50-369/82-40-03).
- d. The inspector noted the completion and approval of procedures for sample traceability, countroom source preparation, quality control for the liquid scintillation counter, and composite samples. This closes a previously inspector identified item (369/81-01-01).
- e. The inspector examined the plant vent and containment purge halogen and particulate air samplers used for effluent accountability. The inspector noted that no pressure corrections are applied for flow rates measured at negative pressures. This results in measured flow rates greater than the actual flows at ambient conditions. The inspector estimated that this effect could result in under reporting of effluent releases by as much as 15 percent. The inspector reviewed the effluent release records for 1982 and determined that no regulatory limits would have been exceeded. The inspector also noted that the halogen and particulate effluent sampling trains do not include pressure gauges. The inspector informed licensee representatives that it is a generally accepted industry practice to include a pressure gauge in close proximity to the rotameter for determining the flow rate pressure correction factor. Licensee representatives agreed to evaluate the need for flow measurement compensation and the need for pressure gauges in the plant vent and containment purge sampling assemblies. This item will be reviewed during a subsequent inspector (50-369/82-70-04).

6. Confirmatory Measurements

Liquid and gaseous samples were collected during this inspection and counted by the licensee and the NRC RII Mobile Laboratory to verify the licensee's capability to measure radionuclides in effluent samples. The samples were analyzed by gamma ray spectroscopy and included the following: floor drain collector tank sample, reactor coolant liquid sample, reactor coolant crud filter, residual heat removal liquid sample, waste gas shutdown tank sample, waste gas tank sample, and a containment atmosphere sample. A spiked charcoal cartridge was counted by the licensee since samples with sufficient iodine activity for comparison were not available during the inspection. The results of the licensee and NRC analyses are presented in Table 1 with the acceptance criteria in Attachment 1.

The results show agreement for all analyses except the waste gas shutdown tank sample which showed possible agreement for Xe-133. The licensee's reported concentration for Xe-133 was 21 percent higher than the NRC concentration. Another waste gas sample counted with the same geometry

resulted in a 1 percent difference between NRC and licensee concentrations. No specific reasons could be determined for the earlier higher than NRC value for Xe-133. Based on results from the later gas sample, the inspector had no further questions.

RESULTS OF CONFIRMATORY MEASUREMENTS AT MCGUIRE UNIT 1, 11/9 - 11/10/82

CONCENTRATION, MICROCURIES / CC.

<u>SAMPLE</u>	<u>NUCLIDE</u>	<u>LICENSEE</u>	<u>NRC</u>	<u>RATIO</u>	<u>RESOLUTION</u>	<u>COMPARISON</u>
Floor Drain	Mn-54	5.13 E-04	5.02 ± .06 E-04	1.02	83	Agreement
Collector Tank	Co-58	4.92 E-03	4.81 ± .02 E-03	1.02	241	Agreement
	Fe-59	2.91 E-05	3.08 ± .4 E-05	.94	7	Agreement
11-9-82 1530	Co-60	3.94 E-03	3.70 ± .05 E-03	1.06	74	Agreement
	I-131	7.64 E-05	7.4 ± .4 E-05	1.04	20	Agreement
Reactor Coolant	Cr-51	3.12 E-03	2.95 ± .04 E-03	1.06	74	Agreement
Crud Filter	Mn-54	9.68 E-05	9.4 ± .4 E-05	1.03	29	Agreement
	Co-58	6.91 E-03	6.53 ± .02 E-03	1.06	326	Agreement
11-10-82 0900	Fe-59	7.47 E-04	6.7 ± .1 E-04	1.11	67	Agreement
	Co-60	4.51 E-04	4.18 ± .06 E-04	1.08	70	Agreement
	Zr-95	4.21 E-05	4.6 ± .5 E-05	.91	10	Agreement
	Nb-95	6.42 E-05	6.4 ± .4 E-05	1.01	18	Agreement
	Sb-122	N.D.	2.0 ± .6 E-05	N.D.	4	No Comparison
Residual Heat	Mn-54	3.66 E-03	3.3 ± .2 E-03	1.11	14	Agreement
Removal Liquid	Co-60	2.91 E-02	2.95 ± .05 E-02	.98	59	Agreement
Sample	Co-58	6.93 E-01	6.73 ± .02 E-01	1.03	336	Agreement
11-10-82 1340	Co-57	5.11 E-04	8.1 ± 2 E-04	.62	5	Agreement
Waste Gas Shutdown	Xe-131	2.06 E-04	1.9 ± .2 E-04	1.06	13	Agreement
Tank B	Xe-133	1.21 E-02	1.22 ± .01 E-02	.99	244	Agreement
11-10-82 1108	Xe-135	1.11 E-05	1.4 ± .13 E-05	.81	11	Agreement
Waste Gas Decay	Xe-131	5.36 E-05	1.1 ± .4 E-05	.48	3	Agreement
Tank B	Xe-131m	2.94 E-04	2.5 ± .2 E-04	1.17	16	Agreement
	Xe-133	3.10 E-02	2.56 ± .01 E-02	1.21	365	Possible Agreement
11-10-82 1130	Xe-135	9.6 E-06	7.1 ± 1.2 E-06	1.34	6	Agreement
Containment	Xe-133	7.21 E-05	6.19 ± .06 E-05	1.16	103	Agreement
Atmosphere						
11-10-82 1410						
Simulated Charcoal	Ba-133	5.23 E-02	5.0 ± 0.1 E-02	1.05	50	Agreement
Cartridge						

N.D. = Not Detected

Attachment 1

CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

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

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

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

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

"A" criteria are applied to the following analyses:

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

Tritium analyses of liquid samples.

"B" criteria are applied to the following analyses:

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

⁸⁹Sr and ⁹⁰Sr Determinations.

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