U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/89004 (DRSS)

Docket No. 50-440 License No. NPF-58

Licensee: The Cleveland Electric
Illuminating Company
10 Center Road
Perry, OH 44081

Facility Name: Perry Nuclear Power Plant, Unit 1

Inspection At: Perry Site, Perry, Ohio

Inspection Conducted: February 6-10, 1989

Inspector: R. Bocanegra 3-20-89
R. Bocanegra Date

Approved by: M. Schumacher, Chief 3-20-89
Radiological Controls Date
and Chemistry Section

Inspection Summary

Inspection on February 6-10, 1989 (Report No. 50-440/89004 (DRSS))
Areas Inspected: Routine announced inspection of confirmatory measurements including: plant chemistry organization, management controls, training, and qualifications, quality assurance, confirmatory measurements for in-plant radiochemical analysis, audits, and post accident sampling analysis (IP 84750); and review of an open item (IP 92701).
Results: Laboratory quality control and confirmatory measurements results were generally very good except for weaknesses in the performance of beta analyses by the licensee's contract laboratory. The results of the particulate filter analyses showed that although the values were within the acceptance criteria, there was a non-conservative bias. The licensee's internal QA audits were found to be broad based, but lacked depth and rigor in technical areas pertaining to this inspection. No violations or deviations were identified.

DETAILS

1. Persons Contacted

[1]T. Boss, Supervisor, Quality Audits
R. Cochnar, Chemistry Specialist
[1]G. Dunn, Supervisor, Compliance
[2]J. Grimm, Chemistry Specialist
[1]H. Hegrat, Operations Engineer
D. Ipoletto, Supervisor, Health Physics
[1]S. Kensicki, Director, Perry Plant Technical Department
[1]A. Lombacher, Audit Coordinator
[1]D. Reyes, Plant Chemist
[1]C. Shelton, Supervisor, Chemistry
G. Van Wey, Chemistry Technician
S. Vodila, Rad Material Shipping Coordinator
[1]D. Wells, QA Inspector
[1]S. Wojton, Manager, Radiation Protection
R. Wolf, Chemistry Specialist

G. O'Dwyer, NRC Resident Inspector

[1]Present at the entrance or exit meetings.
[2]Telephone conversations on February 23 and 27, 1989.

2. Licensee Action on Previously Identified Findings (IP 92701)

(Closed) Open Item (50-440/87020-01): A portion of the collector tank sample will be analyzed for gross beta, tritium, Sr-89, Sr-90, and Fe-55 and the results reported to Region III. A follow-up on this open item found in Report No. 50-440/88008 showed the H-3 result in agreement, and the gross beta, Sr-89, and Fe-55 results in disagreement. A liquid waste sample (spiked with reactor coolant) collected and split during this inspection will be analyzed and followed under a new open item (Section 4). This item is closed.

3. Organization and Training (IP 84750)

The Chemistry Unit has undergone some changes since the previous inspection in this area. One of the two Chemistry Supervisors was transferred to Health Physics. His position is currently being filled by a Senior Chemistry Technician acting as Chemistry Supervisor. The position will soon be permanently assigned to this individual who is ANSI N18.1-1971 (Section 4.3.2) qualified as required by Section 6 of the Perry Technical Specifications (T/S). Two Chemistry Specialists have been hired. One Specialist will focus on QA/QC and the other on training. Six technicians have left the Chemistry Unit and interviews were being conducted to fill four of the positions.

Chemistry Technician training is certified by INPO. Initial training lasts three to six months and involves completing 58 modules in the Laboratory Analyst Qualification Card (Qual Card) after which the trainee is allowed on shift. The Chemistry Technician Qual Card takes approximately two more months of advanced training, and the highest level, Senior Chemistry Technician, additionally requires the ability to perform complicated lab procedures such as detector efficiency calibrations. Technician laboratory proficiency is tested every six months using either in-house radioactive samples prepared by Chemistry Specialists or standards purchased from an outside laboratory. The results are also compared with analyses performed by a contract laboratory on splits of the samples. The inspector observed that the results of analyses performed by the technicians were generally good with approximately 90% of the analyses meeting the +/- 2 sigma criteria on initial tests. All analyses were within acceptance criteria on repeat analyses.

No violations or deviations were identified.

4. Confirmatory Measurements (IP 84750)

a. Quality Assurance

Instrument quality control involves plotting daily source check results and recalibrations when the daily check falls outside +/- 10% of the control value. The inspector reviewed a sampling of germanium detector calibration records and instrument control charts for 1987 and 1988. The inspector also review RAP-0204 Revision 2, "Chemistry Unit Analytical Quality Control Program," and selected procedures in Operations Manual Volume 12-C Chemistry Instructions. The inspector indicated to the licensee that the QA program could be improved by using an independent reference laboratory to provide blind samples on a regular basis instead of relying solely on in-house samples.

The inspector reviewed the radioactivity measurements laboratory quality assurance program including the physical facilities, laboratory operations, and procedures. Housekeeping was generally good; laboratory and counting room working space was ample. Senior Chemistry Technicians were observed and evaluated on sample acquisition, preparation, analysis, and general laboratory practices. The technicians appeared to be knowledgeable, followed proper laboratory procedures, and took appropriate precautions when handling radioactive materials.

The licensee uses the services of a contract laboratory to perform Sr-89, Sr-90, H-3, and Fe-55 analysis. The results of analysis of blind samples submitted by the licensee in December 1988 to the contract laboratory suggested a significant problem in accurately quantifying radioactivity. The licensee has agreed to take corrective action including changing contract laboratories, if necessary. (Open Item 50-440/88004-01)

b. Sample Split

Eight samples (air particulate, spiked air particulate, charcoal adsorber, spiked charcoal adsorber, reactor coolant, liquid waste, crud, and gas) were analyzed for gamma emitting isotopes by the licensee and in the Region III Mobile Laboratory on site. Comparisons were made with the licensee's two Radiochemistry detectors. The licensee achieved 55 agreements in 58 comparisons as listed in Table 1; the comparison criteria are given in Attachment 1.

The last air particulate filter and charcoal adsorber analyzed by the licensee on both detectors prior to the start of the inspection were analyzed by the inspector in the Region III Mobile Laboratory. Since only two nuclides were identified (both agreements), a reactor coolant filter (crud) sample and a spiked charcoal cartridge were analyzed and the results compared. The results for the crud sample showed disagreements for Mn-54, Mn-56, and Cr-51 and also showed a significant negative bias. A recount of the same sample after allowing for interfering nuclides to decay yielded all agreements, but the negative bias was still present. The licensee has agreed to investigate and take corrective action to reduce the bias (Open Item 50-440/89004-02). The results for the spiked charcoal adsorber were all agreements. A filtered reactor coolant sample, liquid waste sample, and a gas sample were analyzed yielding agreements for all nuclides compared.

A portion of a liquid waste sample spiked with reactor coolant will be analyzed for gross beta, H-3, Sr-89, Sr-90, and Fe-55 by the licensee and the results reported to Region III for comparison with an analysis by the NRC reference laboratory on a split of the sample. (Open Item 50-440/89004-03)

The Lower Limit of Detection (LLD) is the smallest concentration of radioactive material in a sample that can, apriori, be detected with 95% certainty. The licensee is required to meet LLD limits found in Technical Specification 3/4.11. At the inspector's request, an LLD was determined by the licensee for the noble gas geometry using vendor supplied software. Then a hand calculation was performed for comparison and found to agree with the vendor's software value.

c. Audits

Quality assurance audits are carried out by onsite QA personnel who report through a management chain that is separate from operations. The operations and QA chain converge at Vice President, Nuclear Group. This arrangement appears to meet the requirement of Technical Specification 6.2.1.d for ensuring QA independence from operational pressures.

The inspector reviewed four QA Audit Reports for 1987 and 1988, and four Surveillance Reports for 1988. No significant findings were made within the scope of this inspection. The audits were generally compliance oriented and somewhat superficial technically. The inspector's review of auditor qualifications indicated that they had received extensive training in subjects being audited, but appeared to lack experience and technical background in radiochemistry and gamma-ray spectroscopy. The inspector's observations were made at the exit meeting.

d. Post Accident Sampling Analysis

The licensee is required by Technical Specification 6.8.3.c to establish, implement, and maintain a Post-accident Sampling system (PASS). The inspectors discussed the PASS, its operation, and maintenance with the licensee. The licensee maintains operating procedures (SO1-P87) and a training manual (CH-4023-000-00) for this system. The purpose of the training manual is to provide the trainee the training necessary to be able to identify the components and describe the operation of the Sentry Post Accident Sampling System, and to be able to safely obtain gaseous and liquid samples from the PASS panel. The panel was operated during the last three emergency plan evaluated exercises on April 15, 1986, May 13, 1987, and May 4, 1988. A weakness noted by the inspector was that training has lately been restricted to individuals participating in the drills and no formal retraining of technicians has occurred since the last inspection in the fourth quarter of 1987. The licensee has scheduled technician PASS retraining for June and November 1989. The licensee has also agreed to conduct PASS training on a regular schedule. These commitments will be reviewed during subsequent inspections and will be followed as an open item. (Open Item 50-440/89004-04)

No violations or deviations were identified.

5. Open Items

Open Items Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Section 4.

6. Exit Meeting (IP 30703)

The inspector met with licensee representatives denoted in Section 1 at the conclusion of the inspection on February 10, 1989. The scope and findings of the inspection were discussed including four items opened as a result of concerns raised by the inspector. The inspector discussed the difficulty the licensee has had with the quality of services provided by a contract laboratory for beta analyses. Also

discussed at the exit meeting was the lack of technician requalification on the PASS and a significant bias in the air particulate filter geometry for both germanium detectors.

The inspector discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. Licensee representatives did not identify any such documents or procedures as proprietary.

Attachments:
1. Attachment 1, Criteria for Comparing Analytical Measurements
2. Table 1, Confirmatory Measurements Program Results, 1st Quarter 1989

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's value to its associated one sigma 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 should be considered acceptable as the resolution decreases. The values in the ratio criteria may be rounded to fewer significant figures reported by the NRC Reference Laboratory, unless such rounding will result in a narrowed category of acceptance.

RESOLUTION	RATIO = LICENSEE VALUE/NRC REFERENCE VALUE 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

Some discrepancies may result from the use of different equipment, techniques, and for some specific nuclides. These may be factored into the acceptance criteria and identified on the data sheet.

TABLE 1

U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

CONFIRMATORY MEASUREMENTS PROGRAM

FACILITY: PERRY

DATE: 1ST QUARTER 1989

SAMPLE	NUCLIDE	NRC VAL.	NRC ERR.	LIC.VAL.	LIC.ERR.	RATIO	RESOL.	RESULT
OFF	XE-135	4.20E-02	1.30E-04	3.80E-02	6.40E-04	0.90	323.1	A
GAS	XE-135M	1.35E-01	2.30E-03	1.10E-01	1.80E-02	0.81	58.7	A
	XE-138	5.00E-01	6.20E-03	4.70E-01	6.10E-02	0.94	80.6	A
CRUD	NA-24	4.90E-03	3.20E-04	3.80E-03	5.86E-04	0.78	15.3	A
	CR-51	3.66E-02	2.00E-03	2.69E-02	3.02E-03	0.73	18.3	D
	MN-54	4.60E-03	2.90E-04	3.28E-03	4.48E-04	0.71	15.9	D
	MN-56	3.90E-02	7.70E-04	2.44E-02	4.16E-03	0.63	50.6	D
	FE-59	4.00E-03	5.20E-04	2.66E-03	8.58E-04	0.67	7.7	A
	CO-58	2.60E-03	2.60E-04	1.69E-03	3.68E-04	0.65	10.0	A
	CO-60	5.30E-03	2.80E-04	4.05E-03	5.48E-03	0.76	18.9	A
	SR-91	9.50E-03	8.40E-04	7.11E-03	1.72E-03	0.75	11.3	A
	SR-92	2.30E-02	8.00E-04	1.86E-02	1.62E-03	0.81	28.7	A
	BA-139	1.80E-01	2.10E-03	1.52E-01	7.90E-03	0.84	85.7	A
	BA-140	5.30E-03	8.20E-04	3.60E-03	1.21E-03	0.68	6.5	A
P FILTER	I-131	1.82E-12	2.08E-13	1.67E-12	4.80E-13	0.92	8.8	A
DET 1	I-133	4.22E-12	5.45E-13	3.39E-12	8.04E-13	0.80	7.7	A
DET 2	I-131	1.82E-12	2.08E-13	1.30E-12	4.82E-13	0.71	8.8	A
	I-133	4.22E-12	5.45E-13	3.49E-12	8.11E-13	0.83	7.7	A
RECOUNT	I-131	1.82E-12	2.08E-13	1.40E-12	4.20E-13	0.77	8.8	A
	I-133	4.22E-12	5.45E-13	4.30E-12	1.30E-12	1.02	7.7	A
CHARCOAL	I-131	1.28E-11	7.17E-13	1.01E-11	1.18E-12	0.79	17.8	A
DET 1	I-133	2.20E-11	1.71E-12	1.54E-11	1.90E-12	0.70	12.9	A
DET 2	I-131	1.28E-11	7.17E-13	9.95E-12	1.09E-12	0.78	17.8	A
	I-133	2.20E-11	1.71E-12	1.97E-11	1.94E-12	0.90	12.9	A
RECOUNT	I-131	1.28E-11	7.17E-13	1.10E-11	1.20E-12	0.86	17.8	A
	I-133	2.20E-11	1.71E-12	2.10E-11	3.20E-12	0.95	12.9	A

TABLE 1 cont'd

SAMPLE	NUCLIDE	NRC VAL.	NRC ERR.	LIC.VAL.	LIC.ERR.	RATIO	RESOL.	RESULT
CRUD	NA-24	4.90E-03	3.20E-04	5.16E-03	1.14E-03	1.05	15.3	A
RECOUNT	CR-51	3.66E-02	2.00E-03	3.11E-02	2.09E-03	0.85	18.3	A
	MN-54	4.60E-03	2.90E-04	3.25E-03	3.46E-04	0.71	15.9	D
	FE-59	4.00E-03	5.20E-04	3.24E-03	5.30E-04	0.81	7.7	A
	CO-58	2.60E-03	2.60E-04	2.00E-03	3.43E-04	0.77	10.0	A
	CO-60	5.30E-03	2.80E-04	4.28E-03	4.38E-04	0.81	18.9	A
	BA-140	5.30E-03	8.20E-04	4.65E-03	7.84E-04	0.88	6.5	A
CHARCOAL	CD-109	2.22E-01	1.02E-02	2.15E-01	6.26E-03	0.97	21.7	A
STANDARD	CS-137	2.50E-02	1.10E-03	2.40E-02	8.25E-02	0.96	22.7	A
	CO-57	2.30E-03	1.13E-04	2.35E-03	1.44E-04	1.02	20.4	A
	CO-60	1.29E-02	6.60E-04	1.26E-02	7.56E-04	0.97	19.6	A
REACTOR	XE-135M	3.30E-04	4.40E-05	3.70E-04	6.50E-05	1.12	7.5	A
COOLANT	XE-135	6.30E-06	1.20E-06	5.40E-06	2.00E-06	0.86	5.3	A
	NA-24	7.40E-05	2.20E-06	7.50E-05	4.30E-06	1.01	33.6	A
	CR-51	4.00E-04	1.30E-05	4.40E-04	2.40E-05	1.10	30.8	A
	NP-239	3.10E-05	3.80E-06	3.20E-05	1.20E-05	1.03	8.2	A
	I-132	8.10E-05	3.20E-06	7.70E-05	4.80E-06	0.95	25.3	A
	I-133	3.60E-05	1.50E-06	4.10E-05	4.00E-06	1.14	24.0	A
	I-134	3.00E-04	7.00E-06	3.00E-04	1.50E-05	1.00	42.9	A
	I-135	8.00E-05	5.40E-06	8.20E-05	1.00E-05	1.03	14.8	A
	SR-91	3.20E-05	5.00E-06	1.90E-05	9.20E-06	0.59	6.4	A
	SR-92	4.10E-05	2.30E-06	4.20E-05	4.40E-06	1.02	17.8	A
GAS	KR-85M	1.10E-02	8.00E-05	1.10E-02	2.70E-04	1.00	137.5	A
	KR-87	4.10E-02	2.80E-04	3.70E-02	1.10E-03	0.90	146.4	A
	KR-88	3.30E-02	2.60E-04	2.90E-02	1.00E-03	0.88	126.9	A
	XE-133	2.60E-02	2.00E-04	2.10E-02	4.70E-04	0.81	130.0	A
LIQUID	CR-51	4.20E-05	9.80E-07	4.40E-05	2.20E-06	1.05	42.9	A
WASTE	MN-54	4.40E-07	4.20E-08	4.60E-07	1.10E-07	1.05	10.5	A
DET 1	CO-60	3.30E-07	5.40E-08	5.10E-07	1.40E-07	1.55	6.1	A
LIQUID	CR-51	4.20E-05	9.80E-07	4.40E-05	2.00E-06	1.05	42.9	A
WASTE	MN-54	4.40E-07	4.20E-08	3.70E-07	9.20E-08	0.84	10.5	A
DET 2	CO-60	3.30E-07	5.40E-08	5.50E-07	1.20E-07	1.67	6.1	A