

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/92015(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: July 20 - 24, 1992

Inspectors: *A. G. Januska*  
A. G. Januska

*8/6/92*  
Date

*S. K. Orth*  
S. K. Orth

*8/6/92*  
Date

Approved By: *M. C. Schumacher*  
M. C. Schumacher, Chief  
Radiological Controls  
Section 1

*8/2/92*  
Date

Inspection Summary

Inspection on July 20 - 24, 1992 (Report No. 50-440/92015(DRSS))

Areas Inspected: Routine announced inspection of: (1) the chemistry program (IP 84750) including organization, reactor systems water quality control programs, quality assurance/quality control program in the laboratory, and nonradiological confirmatory measurements; (2) the Radiological Environmental Monitoring Program (REMP) (IP 84750); and (3) the close out of an open item from a previous inspection.

Results: The licensee continued to maintain excellent reactor water quality and ranked high among the better performing plants. The licensee's nonradiological measurements continue to be good. The licensee is taking proactive measures in replacing air samplers in the REMP. The licensee continues to improve maintenance on the Post Accident Sampling System (PASS) which has a history of leaking valves.

## DETAILS

### 1. Persons Contacted

- <sup>1</sup>T. Boss, Supervisor, Operations Quality Unit
- <sup>1</sup>D. Conran, Compliance Engineer
- <sup>1</sup>J. Detchemensy, Lead Quality Assurance Engineer
- <sup>1</sup>W. Defosses, Radiation Protection Analyst
- <sup>1</sup>M. Dues, Chemistry Technician
- <sup>1</sup>J. Eppich, Manager, Mechanical Design Section
- <sup>1</sup>R. Graham, Responsible System Engineer
- <sup>1</sup>J. Grimm, Plant Chemist
- <sup>1</sup>J. Kutney, Radiation Protection Analyst
- <sup>1</sup>P. Nichols, Engineering Support & STU Lead Engineer
- <sup>1</sup>B. Nyerges, Environmentalist
- <sup>1</sup>C. Shelton, Chemistry General Supervisor
- <sup>1</sup>R. Stratman, General Manager
- <sup>1</sup>P. Volza, Manager, Radiation Protection Section
  
- <sup>1</sup>J. Hopkins, Regional Inspector

<sup>1</sup>Present at the Exit Meeting on July 24, 1992

The inspectors also contacted other licensee employers in the course of the inspection.

### 2. Licensee Action on Previous Inspection Findings (IP 92701)

(Closed) Open Item (50-440/90017-01): Licensee was to send spiked samples to their vendor for strontium and iron-55 analyses, review past liquid releases and make appropriate corrections and issue an errata as needed to their semiannual effluent reports. The inspectors reviewed licensee documentation regarding vendor analyses of spiked strontium and iron samples. The data showed that the results met their acceptance criteria and, therefore, did not necessitate corrections to previous semiannual effluent reports.

### 3. Management Control and Organization (IP 84750)

The inspectors reviewed the Chemistry Unit organization and discussed it with the licensee. In June 1992 the General Supervisor-Technical Support Specialists (GSTS) became the Plant Chemist thus relieving the General Supervisor-Chemistry Operations (GSCO) of the additional duties of acting Plant Chemist. Technical Support Specialists report to the Plant Chemist, who reports to the Manager of Radiation Protection. The GSCO also reports to the Manager of Radiation Protection but reports indirectly to the Plant Chemist for overall program coordination. Five Chemistry Supervisors who direct 16 technicians report to the GSCO. As of the end of this inspection, the Chemistry Unit was fully staffed except for one technician vacancy. The decision whether to fill this vacancy has not been made.

No violations or deviations were identified.

4. Confirmatory Measurements /IP 84750)

The inspectors submitted chemistry samples to the licensee for analyses as part of a program to evaluate the laboratory's capabilities to monitor nonradiological chemistry parameters in various plant systems with respect to regulatory and administrative requirements. These samples had been prepared, standardized, and verified for the NRC in part by the Analytical Chemistry Division of Oak Ridge National Laboratory (ORNL) and by the Radiological Sciences Division of Brookhaven National Laboratory (BNL). The samples were analyzed by the licensee using routine methods and equipment.

Three dilutions were made for each sample by licensee personnel as necessary to bring the concentrations within the ranges normally analyzed by the laboratory, and were analyzed in a manner similar to that of routine samples. The results are presented in Table 1 which also contains the criteria for agreement. These criteria are based on analyses of the standards and on the relative standard deviations (RSD) derived from the results of the plants participating in the 1986 interlaboratory comparisons (Table 2.1, NUREG/CR-5422). The licensee's value is an agreement if within two standard deviations of the standard value and a qualified agreement if within three standard deviations. A qualified agreement may indicate a bias in the assay.

The licensee determined nine analytes at three concentrations each and one at two concentrations. Of the initial 29 analyses 21 were agreements, five were qualified agreements and three (nickel, sodium and boron) were disagreements. Nickel and sodium were rerun after the instruments used were recalibrated which resulted in an agreement and a qualified agreement respectively. It appears that the limited sample size and the atypically low concentration of the sample contributed to the boron disagreement. When the licensee reran this analyte using a very dilute titrant, the results did not change. The high chloride concentration, initially a qualified agreement, was rerun using an additional dilution and resulted in an agreement. The inspectors noted that the final sodium results, although acceptable suggest the presence of a low bias. The licensee agreed to review their procedures, calibrations, and instrument performance for the sodium analysis.

The licensee prepared a sample of reactor water spiked with anions and split it for analysis between the licensee and the NRC reference laboratory. The results will be sent to Region III and compared. This will be followed as an Inspection Follow-Up Item 440/92015-01.

The inspectors observed that the chemistry technician performing the sample dilution and analyses used good laboratory technique and had excellent housekeeping habits.

No violations or deviations were identified.

5. Water Chemistry Control Program (IP 84750)

The inspectors reviewed the licensee's water chemistry control program. The licensee maintained administrative limits on water quality which either met or exceeded the EPRI BWR Owners Group Guidelines. The inspectors reviewed selected trends in water quality over the period of July 1991 through July 1992 and found the chemistry parameters to be well maintained. However, following the last refueling outage, the feedwater conductivity exceeded the administrative limits for a short period of time. Once the reactor was brought up to full power, this parameter appeared to improve.

A review of selected data for the past year indicated that water quality was very good. Reactor coolant chloride and sulfate averaged less than 3 parts per billion (ppb) with EPRI guidelines of 15 ppb for both. The reactor water conductivity averaged 0.14 micro Siemen/cm (uS/cm) with EPRI guidelines of 0.20 uS/cm. Feedwater dissolved oxygen and conductivity were maintained within the EPRI guidelines of 20-50 ppb and 0.06 uS/cm, respectively, with the exception of the excursion discussed above.

The chemistry and plant management reviewed the chemistry parameters on an appropriate frequency and took necessary actions when action levels were exceeded.

No violations or deviations were identified.

6. Implementation of the Laboratory QA/QC Program (IP 84750)

The inspectors reviewed the chemistry quality control program as defined in RAP-0204, Chemistry Unit Analytical Quality Control Program, Revision 3, December 27, 1989. The licensee continued to maintain statistically based control charts for each of the laboratory instruments, to participate in an interlaboratory cross-check program, and to perform semiannual technician proficiency testing.

The licensee maintained control charts for each instrument with warning and control limits set at  $\pm 2$  and 3 standard deviations, respectively. The inspectors reviewed selected control charts and noted that the standard deviation for the atomic absorption spectrophotometer (AAS) appeared excessive. The two standard deviation limits ranged from 20 to 25 percent of the mean for these analyses. Licensee representatives stated that the AAS was a new instrument and that statistical data had only recently been applied to the control charts. Prior to this, the licensee had applied a temporary 10 percent warning limit to the AAS control charts. The licensee will continue to monitor the precision of AAS analyses as the chemistry technicians become more familiar with the instrument and additional data is accumulated. The performance of this instrument will be followed in future inspections. Overall, the performance data showed normal variation about the mean values for each instrument. Biases in performance were properly noted, and appropriate actions were taken.

The inspectors discussed the calibration of laboratory instruments with licensee personnel. Calibration standards were independent from the performance check standards. The AAS was calibrated prior to the analysis of a particular metal. The ion chromatograph and UV-visible spectrophotometer were calibrated as dictated by the instrument's performance.

The licensee's performance in their analytical cross-check program was good. Inspectors reviewed the licensee's results from 1991 through 1992 in which the licensee obtained 21 agreements in 22 comparisons. The licensee properly applied the agreement criteria defined by their procedure. The disagreement noted in the licensee's comparisons with the vendor was a boron analysis. The licensee's result was slightly lower than the vendor's value. At the time of the inspection, the licensee was evaluating their procedure to reduce possible sources of error in this analysis. The review of results from the licensee's chemistry technician testing program indicated that the technicians were tested as required and that their performance was adequate.

No violations or deviations were identified.

7. Post Accident Sampling System (IP 84750)

The inspectors examined the overall operation of the PASS including a tour of the sampling panels, review of calibration of the system's analytical instrumentation, quality control, operability, training, and maintenance. During the tour the inspectors noted that the Containment Isolation (CI) valves were tagged for restricted use under the control of the chemistry unit. These valves had been identified as leaking in Refueling Outage 2 (RFO2), repaired, and only operated during quarterly Technical Specification surveillances. This restriction on valve operation, in accordance with a commitment to the NRC, resulted in less wear on the valves, and subsequently, no valve leakage during cycle 03 had been detected. The licensee had developed specifications for replacement valves. After purchased and satisfactorily tested, they will be installed as needed for the CI valves.

The licensee stated that a number of the valves used on the PASS had a history of leakage and that during semiannual training practicals some leaking valves were usually found. Work requests were issued, and the valves were repaired or replaced. The licensee had recently implemented PAP-1118, Post Accident Sampling Program, revision 0, June 1, 1992, which procedurally designates a priority to maintenance work on the PASS. The licensee stated that PAP-1118 had greatly reduced the number of outstanding work requests on the system.

The inspectors verified that the licensee was able to collect all TS required samples from the multiple sample points. All samples collected would be representative of the system sampled except possibly the dry well sump (DWS) sample. In the licensee's configuration, the demineralized (demin) water system is used to flush all of the PASS collection lines and has historically been found to leak. The DWS

sample pump and all other sampling sources are rated at a higher pressure than the associated demin water pumps; therefore even if the demin valve leaked, the sample should not be diluted and would be representative of the system's activity. However, it was later learned that the DWS pump was currently operating below its rated pressure and below the demin pressure. Since the current sampling procedure did not provide for leak determination, there would be no assurance that the DWS sample is representative of the activity in the DWS. The licensee stated that a revision will be made to the procedure to assure that the system is checked for leakage prior to attempting to collect this sample and that the DWS pump was scheduled to be repaired.

The licensee has 12 chemistry technicians, 5 shift supervisors, and 2 chemistry specialists trained on the operation of the PASS. The inspectors examined current training records which were complete. The training was presented semiannually, concurrent with the required TS surveillance, at which time an actual sample is collected to determine representativeness of the sample. Results of these samples indicated good comparisons with normal laboratory analyses.

No violations or deviations were identified.

8. Radiological Environmental Monitoring Program (IP 84750)

The inspectors examined the REMP, including the 1991 Annual Environmental Operating Report, and toured air sampling stations. The REMP is being implemented in accordance with the TS requirements. The annual report indicated that samples were collected and analyzed in accordance with the licensee's TS. Samples which were not obtained were documented in the report as required. The review of the report did not indicate any abnormal radiological release to the environment.

The inspectors toured several of the air sampling stations with licensee personnel. Sample collection was performed by knowledgeable personnel who appeared very experienced in the filter collection/replacement procedures. Although the current procedure did not require leakage testing of the filter train, the licensee discussed the progress of a revision to the air sampling procedure which will require a test for inleakage. The licensee demonstrated to the inspectors that each of the air stations exhibited no inleakage.

The licensee continued to make improvements in the air sampling program. At the time of the inspection, the licensee was upgrading each of the air stations with new air pumps and volume meters.

No violations or deviations were identified.

9. Audits and Appraisals (IP 84750)

The inspectors reviewed a Chemistry/Chemical Control Program audit PA 91-18 conducted in July 1991 by the onsite Operations Quality Unit and Radiological Environmental Monitoring Program audits PA 90-30 and PA 91-

30 conducted in November 1990 and 1991 respectively. In addition three chemistry surveillances and the qualification of auditors performing chemistry audits were reviewed. The audits were performed in accordance with the required TS frequency. They appeared to be technically sound and performed in sufficient depth. The inspectors verified that statements/commitments made in the audits had been acted on. Although some schedules slipped, for the most part the licensee's actions were timely. The auditors appeared to be well qualified based on education, experience, and training received to achieve various levels of auditor certification.

No violations or deviations were identified.

10. Exit Interview

The scope and findings of the inspection were reviewed with licensee representatives (Section 1) at the conclusion of the inspection on July 24, 1992. During the exit interview, the inspector discussed the likely informational content of the inspection report with regard to documents or processes reviewed during the inspection. Licensee representatives did not identify any such documents or processes as proprietary. The following matters were specifically discussed by the inspector:

- a. the uncertainty of the representativeness of DWS samples under the current conditions and using the current procedures (Section 7);
- b. nonradiological sample split results stressing the difficulty encountered due to the great difference in the concentrations between the supplied samples and the SBLC tank samples normally analyzed (Section 4); and
- c. the improvements in the REMP air sampling stations (Section 8).

Attachment: Table 1, Nonradiological Interlaboratory  
Test Results, July 20 - 24, 1992

TABLE 1  
 Nonradiological Confirmatory Measurements Results  
 Perry Nuclear Station  
 July 20-24, 1992

Analyte	Method <sup>1</sup>	Conc <sup>2</sup>	Ratio <sup>3</sup>	Acceptance Ranges <sup>4</sup>		Result <sup>5</sup>	
				± 2RSD	± 3RSD		
ppb							
Chloride	A	IC	1	1.016	0.933-1.067	0.900-1.100	A
	B		2	0.949	0.917-1.081	0.879-1.121	A
	C		2	0.909	0.926-1.074	0.895-1.105	A+
	Rerun C		1	0.938	0.926-1.074	0.895-1.105	A
Sulfate	A	IC	2	0.936	0.895-1.105	0.842-1.158	A
	B		4	1.059	0.895-1.105	0.868-1.132	A
	C		6	1.047	0.900-1.100	0.867-1.133	A
Iron	G	AA/FU	10	1.062	0.904-1.096	0.854-1.146	A
	H		20	1.002	0.903-1.097	0.857-1.143	A
	I		30	0.972	0.903-1.097	0.855-1.145	A
Copper	G	AA/FU	5	1.082	0.904-1.095	0.859-1.141	A
	H		10	1.011	0.904-1.096	0.857-1.143	A
	I		15	1.044	0.904-1.096	0.857-1.143	A
Nickel	G	AA/FU	10	1.102	0.936-1.064	0.906-1.094	D
	H		20	0.958	0.938-1.062	0.908-1.092	A
	I		30	0.921	0.938-1.062	0.907-1.093	A+
	Rerun G		10	0.972	0.936-1.064	0.906-1.094	A
Chromium	G	AA/FU	10	1.105	0.905-1.095	0.855-1.145	A+
	H		20	0.931	0.903-1.097	0.854-1.146	A
	I		30	0.946	0.903-1.097	0.853-1.147	A
Sodium	J	IC	2	0.861	0.863-1.137	0.784-1.216	A+
	K		4	0.810	0.859-1.141	0.788-1.121	A+
	L		6	0.765	0.862-1.138	0.789-1.211	D
	Rerun L		6	0.809	0.862-1.138	0.789-1.211	A+
Silica	S	Spec	50	0.985	0.906-1.094	0.859-1.141	A
	T		100	0.994	0.909-1.091	0.860-1.136	A

				ppm			
Boron	D	Titr	1000	1.075	0.979-1.021	0.968-1.032	D
	E		2500	1.012	0.979-1.021	0.968-1.032	A
	F		5000	1.016	0.979-1.021	0.968-1.032	A

1. Methods: Titr - Titration  
 IC - Ion Chromatography  
 Spec - Ultraviolet/Visible Spectrophotometry  
 AA/FU - Atomic Absorption Spectrophotometry  
           - Graphite Furnace
2. Conc: Approximate concentration analyzed.
3. Ratio of Licensee mean value to NRC mean value.
4. The standard deviation (SD) in the sixth and seventh columns represents the coefficient of variation obtained from averaging licensee data from the preceding cycle (Table 2.1 of NUREG/CR-5244). A result is considered to be in agreement if it falls within the  $\pm 2$  SD range; a qualified agreement if it lies outside  $\pm 2$  SD, but within  $\pm 3$  SD; and in disagreement if it is outside the  $\pm 3$  SD range.
5. Result:
  - A = Agreement: Licensee value is within  $\pm 2$  SDs of the NRC mean value.
  - A+ = Qualified agreement, licensee is between  $\pm 2$  and  $\pm 3$  SDs of the NRC value.
  - D = Disagreement: licensee value is outside  $\pm 3$  SDs.