

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-295/82-30(DEPOS); 50-304/82-27(DEPOS)

Docket Nos. 50-295; 50-304

Licenses No. DPR-39; DPR-48

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: Zion Nuclear Generating Station

Inspection At: Zion Nuclear Generating Station, Units 1 and 2

Inspection Conducted: December 6-16, 1982

Inspectors: *M. Schumacher for* 1/10/83
S. Rozak,
M. Schumacher for 1/10/83
N. A. Nicholson,
M. Schumacher for 1/10/83
M. J. Oestmann,
M. Schumacher 1/10/83
Approved By: M. C. Schumacher, Chief
Independent Measurements and
Environmental Protection Section

Inspection Summary

Inspection on December 6-16, 1982 (Reports No. 50-295/82-30(DEPOS);
50-304/82-27(DEPOS))

Areas Inspected: Routine, unannounced inspection of the Confirmatory Measurements Program including inplant sample split and onsite analysis with the Region III Mobile Laboratory; review of the licensee's laboratory practices and quality control; review of the Radiological Environmental Monitoring Program (REMP) implementation and results; and review of open items identified during previous inspections. The inspection involved 66 inspector-hours onsite by two NRC inspectors and 12 inspector-hours at the corporate office by three NRC inspectors.

Results: No items of noncompliance were identified in six of the seven areas inspected. One apparent item of noncompliance was identified in the area of quality control (Section 5) - failure to have an approved procedure for EBAR determination required by Technical Specification 6.2.A.7 - Severity Level V.

DETAILS

1. Persons Contacted

K. L. Graesser, Station Superintendent
*G. Pliml, Assistant Superintendent
*R. Placko, Quality Control Inspector
*W. Store, Quality Assurance Inspector
T. Rick, Rad Chemistry Supervisor
*B. Schramer, Station Chemist
*J. Jirka, Unit Chemist
M. Ahlgrim, Engineering Assistant
F. Ost, Lead Health Physicist
**J. Golden, Supervisor, Radioecology/Emergency Planning
R. Moore, GSEP Coordinator
L. Literski, Environmental Meteorologist
J. Pajowski, Environmental Engineer

*Attended exit meeting onsite December 13, 1982.

**Discussed REMP findings by telephone December 16, 1982.

2. Scope

Four inplant samples were collected and analyzed onsite for comparative gamma isotopic activity with the Region III Mobile Laboratory. Beta analyses of the liquid sample will be completed by the Radiological Environmental Services Laboratory (RESL) and the licensee, and compared in an addendum to this report. The quality assurance program for the counting and chemistry laboratories was inspected, including procedural review and laboratory tour.

The 1981 annual Radiological Environmental Monitoring Program (REMP) reports were reviewed, as were available 1982 data. The inspectors discussed the REMP implementation and results with corporate representatives. Five selected environmental stations were inspected.

3. Licensee Action on Previous Inspection Findings

(Closed) Violation Severity Level VI (50-304/81-08-01; 50-295/81-08-01): A sediment sample collected in 1980 was not collected at the sampling point specified in Section 4.16 of Appendix A, Technical Specifications. The licensee responded to this violation in a letter dated June 29, 1981. Licensee representatives stated that the sample collector has been instructed to collect the samples at the required locations.

4. Sample Analyses

Four inplant samples (lake discharge tank liquid, and Unit 1 containment air particulate filter, charcoal cartridge, and gas) were collected and analyzed onsite with the Region III Mobile Laboratory for gamma isotopic activity. Comparative results are presented in Table 1; comparison

criteria are outlined in Attachment 1. Nineteen of twenty comparisons were categorized as agreements or possible agreements. The lake discharge liquid sample will be analyzed for tritium, strontium-89 and -90, and gross beta activity (to be counted January 11, 1983, 11:00 a.m. CST) by RESL and the licensee. Licensee representatives agreed to submit beta results to the Region III office by March 1, 1983, for comparison in an addendum to this report (Open Item 295/82-30-01; 304/82-27-01).

The disagreement involved licensee failure to quantify bromine-82 on the charcoal cartridge sample of containment atmosphere, despite its presence in a concentration approximating that of iodine-135. Several bromine-82 lines were listed as unidentified in the licensee's printout but were unevaluated because this isotope was not listed in his software library. Licensee records of spectral analyses indicated this was not an isolated occurrence as unevaluated bromine-82 lines were observed by the inspectors in containment samples obtained in January, May, and September 1982. The samples in question were not used to quantify releases but are used to establish containment entry requirements. MPC fractions attributed to bromine-82 in the samples were one percent or less of that attributable to iodine-131.

The importance of reviewing all spectra to assure that no isotope of significance is missed was discussed at the exit interview and subsequently by telephone with Mr. Brent Schramer, Station Chemist, on December 28, 1982.

The inspectors discussed possible sources of bromine-82 activity with licensee representatives. Direct fission yields listed for this isotope are very low and appear unlikely to be its source. A more likely source would appear to be activation of stable bromine in containment air around the reactor vessel. Licensee representatives agreed to investigate the problem including the concentration and period of time bromine-82 has been present in containment and to report these findings to Region III by March 1, 1983. (Open Item 295/82-30-02; 304/82-27-02).

Approximately 10-12% of the total particulate activity observed by the NRC was on the charcoal cartridge. Licensee representatives stated particulates on the charcoal adsorber are not quantified, as the adsorber is used exclusively for iodine concentration reporting. This results in an underreporting of particulate activity. Licensee representatives agreed to evaluate the significance of particulate breakthrough, specifically to verify that filters are properly seated and to modify the 1982 annual effluent report based on review of previous data, if necessary (Open Item 295/82-30-03; 304/82-27-03).

No correction factor for sample decay during collection is applied to the charcoal analyses. This underestimates short lived isotope concentrations. Licensee representatives agreed to apply this correction in the future and to modify the 1982 annual report, if necessary (Open Item 295/82-30-04; 304/82-27-04). The inspectors' review of previous annual effluent reports indicated that iodine-131 concentrations would not exceed a few percent at the Technical Specification limit if a correction factor of three were applied.

A Unit 1 primary water sample was analyzed by the inspectors to determine EBAR. This sample activity was below the 57.7/EBAR limit specified by Technical Specification 3.3.6.

No items of noncompliance was identified.

5. Quality Control of Analytical Measurements

The inspectors toured the licensee's chemistry laboratory and counting room. Performance checks are performed and logged daily on instruments in the counting room. The licensee is converting to Commonwealth Edison Company's Automated Analytical Instrumentation System (AAIS) but this system is not currently in routine use and was not used for sample comparisons performed during this inspection.

The Chemistry laboratory was in the process of being remodeled. Several new instruments were being put into service. The inspectors noted that several chemical solutions with an expiration date of December 4, 1982, were still on the benches presumably being used. Licensee representatives stated that an incorrect expiration date had been written on these and in fact they had not exceeded their shelf life. Of the analytical instruments in the lab only a few balances displayed calibration stickers. Procedures ZCP-51 and ZCP-52 provide for calibration frequencies of laboratory and instruments and administrative actions to be taken when these frequencies are not met. These procedures were approved on August 31, 1982; only four balances had been calibrated since that date and several instruments were overdue. Licensee representatives stated that these procedures had been written in response to INPO recommendations and licensee internal audits and are scheduled to be fully implemented by April 1983. This will be examined during the next inspection (Open Item 50-295/82-30-05; 50-304/82-27-05). Until now, laboratory instruments were calibrated when the analysts judged it was necessary.

The inspectors reviewed selected radiochemical and counting room procedures. No approved procedure now exists for an EBAR analysis required by Sections 3.3/4.3 of Appendix A, Technical Specifications. An "informal" procedure does exist, but this has not been formally approved. Appendix A, Technical Specifications 4.2.A requires that detailed written procedures, including applicable checkoff lists, shall be prepared, approved and adhered to for surveillance and testing requirements. Technical Specifications 4.3.6 sets the requirement for twice yearly EBAR surveillance. This constitutes an apparent item of noncompliance.

One item of noncompliance was identified.

6. Implementation of the Radiological Environmental Monitoring Program (REMP)

The inspectors examined records pertaining to the REMP at the licensee's corporate office in Chicago. Review of the 1981 annual report and of monthly contractor reports through September 1982, indicated compliance with monitoring requirements of the technical specifications. It also indicated that all samples had been properly collected at the locations specified in Table 4.16-1.

The 1981 Annual Effluent Report contained several errors missed in the licensee's internal review process. Included were non-routine reporting levels listed in Table 5.0-1 which differed from Technical Specification 4.16 values, incorrect locations given for Air Sample No. 11 in Figure 5.0-1, and an incorrect LLD (Lower Level of Detection) value for gross beta analysis of particulate filters. Licensee representatives agreed to issue corrections to the report. (Open items 50-295/82-30-06; 50-304/82-22-06).

The inspectors examined the Quality Assurance Department Audit QA-22-82-34 of the Environmental Monitoring Program, and audits QA-12-81-63 and QA-12-82-47 of Hazelton Environmental Sciences Corp., the contractor for the REMP. There were no deficiencies identified in Audit QA-22-82-34. Hazelton responded promptly to audit findings and observations in Audits QA-12-81-63 and QA-12-82-47.

The inspectors noted that air monitoring equipment was operable and properly maintained during a tour of five air monitoring stations. Thermoluminescent dosimeters (TLD's) were also observed to be properly placed at the monitoring station. Two NRC TLD's were also observed to be in place at sites collocated with the licensee's TLDs. A comparison of results for collocated NRC and licensee TLDs in 1981 indicates that licensee results averaged about 60% of the NRC results throughout the year.

No items of noncompliance or deficiencies were identified.

7. Exit Interview

The inspectors met with licensee representatives onsite (Section 1) on December 13, 1982, to discuss the inspector findings. During this meeting, licensee representatives agreed to:

- (a) Analyze the Lake Discharge Tank sample for tritium, strontium-89, strontium-90, and gross beta (to be counted January 11, 1983 at 11:00 CST) and to submit the results to Region III by March 1, 1983. (Section 4).
- (b) Investigate the source and significance of bromine-82 in containments and to report the finding to Region III by March 1, 1983. (Section 4).
- (c) Evaluate particulate breakthrough of particulate filters and to correct the annual effluent report to reflect, if necessary, particulate activity captured on charcoal cartridges. (Section 4).
- (d) Institute use of a correction factor to account for decay of short lived isotopes during sample collection and to include corrected values in the current annual effluent report. (Section 4).
- (e) Complete calibration of chemistry instruments by April 1, 1983. (Section 5).

The results of the REMP review were discussed by telephone with Dr. John Golden on December 16, 1982. Dr. Golden agreed to issue corrections to the 1981 REMP annual report. (Section 6).

Problems with the review of spectral data were discussed by telephone with Mr. Brent Schramer on December 28, 1982. Mr. Schramer stated the bromine-82 had been added to the system library and that steps would be taken to insure better review of analytical data. (Section 4).

Attachments:

1. Table 1, Confirmatory Measurements Program, 4th quarter 1982.
2. Attachment 1, Criteria for Comparing Analytical Measurements.

TABLE I

U S NUCLEAR REGULATORY COMMISSION
 OFFICE OF INSPECTION AND ENFORCEMENT
 CONFIRMATORY MEASUREMENTS PROGRAM
 FACILITY: ZION
 FOR THE 4 QUARTER OF 1982

SAMPLE	ISOTOPE	-----NRC-----		---LICENSEE---		---LICENSEE:NRC---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
P FILTER	CS-134	7.0E-04	2.4E-05	8.2E-04	0.0E-01	1.2E 00	2.9E 01	A
	CS-137	1.5E-03	3.7E-05	1.6E-03	0.0E-01	1.1E 00	4.1E 01	A
	I-133	4.8E-04	2.4E-05	5.9E-04	0.0E-01	1.2E 00	2.0E 01	A
C SPIKED	CD-109	4.0E-01	2.2E-02	4.3E-01	0.0E-01	1.1E 00	1.8E 01	A
	CO-57	8.9E-03	5.5E-04	9.3E-03	0.0E-01	1.0E 00	1.6E 01	A
	CE-139	9.6E-03	5.1E-04	9.8E-03	0.0E-01	1.0E 00	1.9E 01	A
	HG-203	1.8E-02	8.8E-04	1.7E-02	0.0E-01	9.4E-01	2.0E 01	A
	SN-113	2.3E-02	1.2E-03	2.5E-02	0.0E-01	1.1E 00	1.9E 01	A
	CS-137	2.0E-02	1.2E-03	2.3E-02	0.0E-01	1.1E 00	1.7E 01	A
	CO-60	2.6E-02	1.4E-03	2.7E-02	0.0E-01	1.0E 00	1.9E 01	A
C FILTER	I-131	1.8E-02	1.2E-03	2.2E-02	0.0E-01	1.2E 00	1.5E 01	A
	I-132	7.6E-04	1.2E-04	1.1E-03	0.0E-01	1.4E 00	6.3E 00	A
	I-133	1.0E-02	1.6E-04	1.2E-02	0.0E-01	1.2E 00	6.2E 01	A
	I-135	4.9E-03	3.8E-04	5.9E-03	0.0E-01	1.2E 00	1.3E 01	A
	BR-82	1.5E-03	8.0E-05	0.0E-01	0.0E-01	0.0E-01	1.9E 01	D
OFF GAS	XE-133	6.7E-04	2.3E-06	8.3E-04	0.0E-01	1.2E 00	2.9E 02	P
	XE-135	7.0E-06	2.3E-07	7.1E-06	0.0E-01	1.0E 00	3.0E 01	A
L WASTE	CO-58	1.6E-06	1.5E-07	1.6E-06	0.0E-01	1.0E 00	1.1E 01	A
	CO-60	6.4E-06	2.8E-07	7.6E-06	0.0E-01	1.2E 00	2.3E 01	A
	CS-137	6.3E-07	1.7E-07	1.5E-06	0.0E-01	2.4E 00	3.7E 00	A

T TEST RESULTS:

A=AGREEMENT

D=DISAGREEMENT

P=POSSIBLE AGREEMENT

N=NO COMPARISON

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 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 to maintain statistical consistency with the number of significant figures reported by the NRC Reference Laboratory, unless such rounding will result in a narrowed category of acceptance. The acceptance category reported will be the narrowest into which the ratio fits for the resolution being used.

<u>RESOLUTION</u>	<u>RATIO = LICENSEE VALUE/NRC REFERENCE VALUE</u>		
	<u>Agreement</u>	<u>Possible Agreement "A"</u>	<u>Possible Agreeable "B"</u>
<3	No Comparison	No Comparison	No Comparison
>3 and <4	0.4 - 2.5	0.3 - 3.0	No Comparison
>4 and <8	0.5 - 2.0	0.4 - 2.5	0.3 - 3.0
>8 and <16	0.6 - 1.67	0.5 - 2.0	0.4 - 2.5
>16 and <51	0.75 - 1.33	0.6 - 1.67	0.5 - 2.0
>51 and <200	0.80 - 1.25	0.75 - 1.33	0.6 - 1.67
>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.

Sr-89 and Sr-90 determinations.

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