

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-456/91011(DRSS); 50-457/91009(DRSS)

Docket Nos. 50-456; 50-457

License Nos. NPF-72; NPF-77

Licensee: Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL 60515

Facility Name: Braidwood Nuclear Power Station, Units 1 and 2

Inspection At: Braidwood Site, Braceville, Illinois

Inspection Conducted: March 18-21, 1991 (On Site)

Inspector: *J. E. House*
J. E. House

4-4-91
Date

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

4-4-91
Date

Inspection Summary

Inspection on March 18-21, 1991 (Report Nos. 50-456/91011(DRSS); 50-457/91009(DRSS))

Areas Inspected: Routine announced inspection of: (1) radiological confirmatory measurements (IP 84750); audits and surveillances (IP 84750); implementation of the quality assurance program (IP 84750); postaccident sampling system (IP 84750); and review of open items (IP 92701).

Results: Confirmatory measurement results were very good and the licensee's vendor supplied interlaboratory crosscheck program results were all agreements. Laboratory quality assurance was good. Progress of the postaccident sampling system QA improvement program appeared to be on schedule. No violations or deviations were identified.

DETAILS

1. Persons Contacted

- 1 J. Burns, Chemistry Services
- 1 E. Carroll, Regulatory Assurance
- 1 B. Engstrom, HRSS Chemist
- 1 R. James, Engineering Assistant, Counting Room
- 1 K. Kofron, Station Manager
- 1 R. Kyrcauc, NQP Superintendent
- 1 K. Medlar, Chemistry Services
- 1 D. O'Brien, Technical Superintendent
- 1 J. Petro, Chemistry Supervisor
- 1 G. Vickery, Chemist
- 1 J. Watson, NQP Engineer
- 1 P. Zolan, Regulatory Assurance

- 1 R. Kopriva, Resident Inspector, NRC
- 1 T. Kobetz, Project Inspector, NRC

1 Present at the Exit Meeting on March 21, 1991

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

- a. (Open) Open Item (50-456/90005-02; 50-457/90005-02): Licensee to improve Quality Assurance program for inline analytical equipment in the High Radiation Sampling System (HRSS) including calibration and routine testing. The licensee has made considerable progress in terms of equipment repair, instrument calibration, performance checks, procedure preparation and training. The improvement program appeared to be on schedule, as instrumentation is functional and calibrated; procedures have been written or are in process, and training will be performed when approved procedures are available. The licensee is scheduled to have this program completed by May 1991. The inspector noted to licensee representatives that the program would again be reviewed upon completion.

- b. (Closed) Open Item (50-456/90022-03; 50-457/90024-03): Licensee to complete corrective actions in response to an apparently altered certification of standard analytical weights. Nuclear Quality Programs (NQP) has performed an extensive investigation of chemistry records (Field Monitoring Reports QAL 20-91-044; QAL 20-91-029). These reports covered nineteen areas of chemistry QA over a two month period and no evidence of faulty laboratory QA records were found.

3. Confirmatory Measurement (IP 84750)

a. Sample Split

Five samples (charcoal filter, air particulate intercomparison standard, off-gas, primary coolant and liquid radwaste) were analyzed for gamma emitting isotopes by the licensee and in the Region III Mobile Laboratory on site. Comparisons were made on the licensee's four counting room detectors. Results of the sample

comparisons are given in Table 1 and the comparison criteria are given in Attachment 1. The licensee achieved 37 agreements out of 39 comparisons. Charcoal filter, air particulate intercomparison standard, off-gas and liquid radwaste sample comparisons were all agreements.

The Mn-54 comparison in primary coolant was a disagreement on each of the two detectors on which the licensee counted the sample. The licensee's spectral analysis indicated that Mn-54 was present; however a manual analysis was performed by a licensee representative who stated that the Mn-54 was, in fact, I-135 which interferes with Mn-54, and which the licensee's software also identified. The NRC system identified both I-135 and Mn-54. I-135 along with Kr-88 appeared to interfere with the Mn-54 on the NRC system. The inspector recounted the NRC sample two days later. The Kr-88 had decayed away and the 836.8 KeV line of I-135 (abundance of 6.67%), which can interfere with Mn-54, was not seen. Mn-54 was identified by its 834.83 line but I-135 was rejected. The licensee then recounted a primary coolant sample which had decayed for about 30 hours and the software identified both Mn-54 and I-135, however it could not be determined whether or not the 836.8 peak of I-135 was being identified as Mn-54. The inspector discussed the NRC and licensee data with the licensee representative who agreed that Mn-54 was present. Since the licensee's technical specifications do not require that Mn-54 be quantitated in primary coolant and the E-BAR determination procedure incorporates adequate decay periods, no further action is required on the licensee's part. Overall, the licensee performed well in the confirmatory measurements program. The licensee has acquired a new gamma spectroscopy system (same detectors) which is being tested and should be on line in a few months.

A portion of the liquid waste sample will be analyzed for gross alpha, 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 same sample (Open Item 50-456/91011-01; 50-457/91009-01).

b. Quality Assurance

The inspector reviewed the radioactivity measurements laboratory quality assurance program including physical facilities and laboratory operations. Housekeeping was generally good; laboratory and counting room work space was adequate. Chemistry technicians observed during sample acquisition and preparation appeared to have good laboratory technique.

The licensee participates in an interlaboratory cross-check program with an outside vendor. The inspector examined the 1990 results and found all agreements.

The inspector reviewed selected records from the instrument quality control program. Tests were run as required, results recorded and data for control charts was stored in a computer data base.

No violations or deviations were identified

4. Audits and Assessments (JP 84750)

The inspector reviewed a Chemistry and Radwaste Assessment conducted October 22-26, 1990, by a team composed of personnel from various CECO stations, Corporate QA, and one individual from an outside utility; QAS 20-90-060, Chemistry Surveillance conducted from June 1-12, 1990; Nuclear Quality Program Audit Report No. 20-90-14, October 29, 1990 and Field Monitoring Reports QAL 20-91-029 and QAL 20-91-044. These assessments, audits and field monitoring reports reviewed sampling techniques, sample preparation and analysis, data trending, technician training, instrument calibration and reagent preparation. Observations of technician performance along with documentation of the QA program was emphasized in these QA reviews. The laboratory appeared to respond in a timely manner to findings and observations.

The Nuclear Quality Program (NQP) at the Braidwood Station has developed an exchange program between the departments and NQP in which personnel are able to exchange roles. One chemistry foreman has participated in the NQP audit program of chemistry and one NQP auditor was assigned to the chemistry laboratory. This program could improve the auditing capability and provide greater QA emphasis in chemistry. This will be reviewed in subsequent inspections.

The audit, assessment and surveillance programs appeared to be satisfactory.

No violations or deviations were identified.

5. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspectors, and which involve some action on the part of the NRC or licensee, or both. An open item disclosed during the inspection is discussed in Section 3.

6. Exit Interview

The scope and findings of the inspection were reviewed with licensee representatives (Section 1) at the conclusion of the inspection on March 21, 1991. The inspector discussed the preliminary confirmatory measurements results, progress in the post accident sampling system quality assurance program, audits, licensee performance in the interlaboratory comparison program and laboratory quality assurance.

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

Attachments:

1. Table 1, Radiological Interlaboratory Split Sample Results, 1st Quarter 1991
2. Attachment 1, Criteria for Comparing Radiological Measurements

TABLE 1
 U.S. NUCLEAR REGULATORY COMMISSION
 REGION III
 FACILITY: BRAIDWOOD
 FOR THE 1ST QUARTER OF 1991

SAMPLE	NUCLIDE	NRC VAL.	NRC ERR.	LIC.VAL.	LIC.ERR.	RATIO	RESOL.	RESULT
REACTOR	NA-24	9.96E-04	4.03E-05	8.00E-04	7.20E-05	0.80	24.7	A
COOLANT	MN-54	3.92E-04	2.45E-05	0.00E+00	0.00E+00	0.00	16.0	D
DET. 22	CO-58	3.19E-04	2.45E-05	2.20E-04	0.00E+00	0.69	13.0	A
	W-187	5.15E-04	1.19E-04	2.70E-04	3.40E-05	0.52	4.3	A
	I-131	1.11E-03	2.93E-05	1.00E-03	7.00E-05	0.90	37.8	A
	I-132	7.31E-03	1.80E-04	6.40E-03	3.60E-04	0.88	40.7	A
	I-133	4.32E-03	4.18E-04	4.00E-03	3.50E-04	0.93	10.3	A
	I-135	7.89E-03	2.55E-04	6.70E-03	3.10E-04	0.85	31.0	A
	CS-137	3.88E-05	1.32E-05	4.40E-05	9.00E-06	1.13	2.9	N
REACTOR	NA-24	9.96E-04	4.03E-05	7.60E-04	7.10E-05	0.76	24.7	A
COOLANT	MN-54	3.92E-04	2.45E-05	0.00E+00	0.00E+00	0.00	16.0	D
DET. 26	CO-58	3.19E-04	2.45E-05	2.70E-04	0.00E+00	0.85	13.0	A
	W-187	5.15E-04	1.19E-04	3.10E-04	3.70E-05	0.60	4.3	A
	I-131	1.11E-03	2.93E-05	1.00E-03	1.00E-04	0.90	37.8	A
	I-132	7.31E-03	1.80E-04	5.70E-03	3.90E-04	0.78	40.7	A
	I-133	4.32E-03	4.18E-04	3.80E-03	3.50E-04	0.88	10.3	A
	I-135	7.89E-03	2.55E-04	6.80E-03	3.20E-04	0.86	31.0	A
	CS-137	3.88E-05	1.32E-05	0.00E+00	0.00E+00	0.00	2.9	N
CHARCOAL	I-131	2.91E-12	1.82E-13	2.70E-12	2.30E-13	0.93	16.0	A
DET. 28	I-133	9.35E-13	3.27E-13	7.10E-13	1.56E-13	0.76	2.9	N
AIR	CR-51	1.18E-01	9.32E-03	1.10E-01	1.20E-02	0.93	12.7	A
PART.	MN-54	3.94E-02	3.10E-04	4.30E-02	3.60E-03	1.09	127.1	A
SPIKE	FE-59	4.04E-02	1.79E-03	4.30E-02	2.80E-03	1.06	22.6	A
DET. 28	CO-60	3.88E-02	2.99E-04	4.10E-02	2.50E-03	1.06	129.8	A
	ZN-65	5.73E-02	7.00E-04	6.40E-02	5.40E-03	1.12	81.9	A
	CS-134	1.70E-02	1.90E-04	1.80E-02	0.00E+00	1.06	89.5	A
	CS-137	2.66E-02	2.31E-04	2.80E-02	2.40E-03	1.05	115.2	A
	CE-141	3.94E-02	8.56E-04	4.00E-02	3.50E-03	1.02	46.0	A
	CE-144	2.95E-02	4.90E-04	2.80E-02	0.00E+00	0.95	60.2	A

SAMPLE	NUCLIDE	NRC VAL.	NRC ERR.	LIC.VAL.	LIC.ERR.	RATIO	RESOL.	RESULT
LIQUID	MN-54	1.85E-07	3.95E-08	2.50E-07	4.20E-08	1.35	4.7	A
RADWASTE	FE-59	2.58E-07	6.72E-08	2.70E-07	7.20E-08	1.05	3.8	N
DET. 25	CO-58	4.68E-06	1.13E-07	5.00E-06	4.40E-07	1.07	41.4	A
	CO-60	9.28E-07	6.39E-08	9.40E-07	7.60E-08	1.01	14.5	A
	NB-95	2.67E-07	5.05E-08	1.90E-07	0.00E+00	0.71	5.3	A
	3B-124	2.26E-07	5.38E-08	1.80E-07	6.00E-08	0.80	4.2	A
	SB-125	1.70E-06	1.56E-07	1.70E-06	2.10E-07	1.00	10.9	A
	CS-134	5.05E-07	7.90E-08	3.50E-07	5.70E-08	0.69	6.4	A
	137	3.53E-07	4.59E-08	2.90E-07	5.20E-08	0.82	7.7	A
OFFGAS	K. 35	1.05E-03	2.95E-04	1.10E-03	2.10E-04	1.05	3.6	N
DET. 26	KR-85M	4.57E-05	3.42E-06	4.10E-05	4.40E-06	0.90	13.4	A
	XE-131M	6.89E-04	7.28E-05	4.60E-04	0.00E+00	0.67	9.5	A
	XE-133	6.95E-02	8.67E-05	6.50E-02	0.00E+00	0.94	801.6	A
	XE-133M	9.19E-04	2.74E-05	8.40E-04	7.90E-05	0.91	33.5	A
	XE-135	1.13E-03	7.96E-06	1.10E-03	7.00E-05	0.97	142.0	A

TECT RESULTS:

A=AGREEMENT
D=DISAGREEMENT
* CRITERIA RELAXED
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'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.

<u>RESOLUTION</u>	<u>RATIO = LICENSEE VALUE/NRC REFERENCE VALUE</u>
	<u>Agreement</u>
<4	NO COMPARISON
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.