

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-237/91020(DRSS); 50-249/91020(DRSS)

Docket Nos. 50-237; 50-249

Licenses No. DPR-19; DPR-25

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

Facility Name: Dresden Nuclear Power Station, Units 2 and 3

Inspection At: Dresden Site, Morris, Illinois

Inspection Conducted: June 17-20, 1991

Inspector: *A. G. Januska*  
A. G. Januska

7/1/91  
Date

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

7/1/91  
Date

Inspection Summary

Inspection on June 17-20, 1991 (Report Nos. 50-237/91020(DRSS);  
50-249/91020(DRSS))

Areas Inspected: Routine unannounced inspection of the licensee's confirmatory measurements program (IP 84750) including: audits, quality assurance, quality control, and confirmatory measurements of in-plant radiochemical analyses.

Results: The licensee's analytical capability for radiochemistry measurements is good. Measures to enhance the laboratory quality control (QC) program have been instituted with more being developed.

## DETAILS

### 1. Persons Contacted

- \*L. Gerner, Technical Superintendent
- \*R. Kociuba, Nuclear Quality Programs Superintendent
- \*D. Lowenstein, Regulatory Assurance Analyst
- \*B. Mayer, Nuclear Quality Programs Inspector
- \*K. Whittum, Lead Chemist
- \*L. Wolfe, Chemist

The inspector also contacted other licensee employees.

\* Denotes those present at the Exit Meeting on June 20, 1991

### 2. Licensee Action on Previous Inspection Findings(84750)

(Closed) Open Item (237/90015-01; 249/90014-01): Licensee to add Am-241 to the gamma spectrometry library, and results of split liquid radwaste and offgas crosscheck samples to be examined during a subsequent inspection. The inspector saw documentation stating that Am-241 had been added to the library and saw evidence to confirm this. Also the results of liquid radwaste and offgas crosscheck samples were all in agreement with appropriate criteria.

(Closed) Open Item (237/90015-02; 249/90014-02): Licensee to analyze a split and a spiked sample and send the results to Region III for comparison. The results of these analyses are presented in Table 1; the comparison criteria are presented in Attachment 1. Due to poor counting statistics, no comparisons were made for gross alpha, gross beta, Sr-89 and Sr-90 for the radwaste sample. The licensee achieved all agreements for the remaining analyses except for Sr-89 on the spike sample. This will be examined when the results of a sample split during this inspection are received and compared (Section 4) and if warranted, another spike will be sent to the licensee.

### 3. Changes (IP 84750)

The inspector reviewed management controls, organization, and changes made in the Chemistry Department. The Department is headed by a Chemistry Supervisor who reports to the Technical Superintendent. The Chemistry Supervisor supervises a Lead Chemist, Waste Products, a Quality Chemist, a Chemical Control Coordinator, Procedures Upgrade and two Foremen. The Lead Chemist supervises a unit Chemist, an Auxiliary Chemist, a Radiochemist, two lab Chemists, an Engineering Assistant and a Computer Coordinator. The Foremen supervise 13 Chemistry Technicians (CTs). The positions of Chemical Control Coordinator and Computer Coordinator are temporary and the Procedures Upgrade person is a contractor and is also temporary. Since the last inspection, Waste Products, and Chemical Control split to become individual entities, the Radiochemist transferred out of the Department and was replaced, and one

CT was lost to the Training Department. These changes did not adversely affect the Department.

The Chemistry Department recently obtained a new gamma spectroscopy system which has been installed in the counting room and is in the process of being tested prior to being made operational.

4. Radiological Confirmatory Measurements (IP 84750)

Five samples (simulated air particulate, charcoal, gas, reactor coolant and liquid waste) were analyzed for gamma emitting isotopes by the licensee and in the Region III Mobile Laboratory on site. Comparisons were made on combinations of available detectors. Results of the sample comparisons are given in Table 2; the comparison criteria are given in Attachment 1. The licensee achieved 93 agreements out of 94 comparisons.

Agreements were achieved for charcoal, offgas, and liquid waste samples. Two different liquid waste samples were analyzed as one only contained three nuclides. Initially the licensee did not identify Ba-139 on one detector and quantified it incorrectly on another for a reactor coolant sample. Discussion with the licensee indicated that he used an abundance different than the inspector's. Examination of the spectral data revealed that the nuclide was truly present in one case and that the software did not use the entire peak for quantification in the other case. The licensee estimated the activity of this nuclide manually and achieved agreements. The licensee is in the process of changing to a different gamma spectrometry system (Section 3) and agreed to assure that this nuclide is quantified accurately for the monthly fuel warranty analysis in the future. A disagreement for failing to identify Zn-65 on an analyses of a reactor coolant crud sample used to simulate an air particulate sample was noted. No reason for the disagreement was found. The licensee will have a portion of the liquid waste sample split analyzed for gross beta, H-3, Sr-89, Sr-90 and Fe-55 and report the results to Region III for comparison with an analysis by the NRC Reference Laboratory on a split of the same sample. (Open Item 237/91020-01; 249/91020-01)

No violations or deviations were identified.

5. Audits (IP 84750)

The inspector reviewed quality assurance audits 12-89-02 and 12-90-14, and approximately 18 Chemistry/Radiochemistry related Field Monitoring Reports (FMRs) completed in 1991. The audits were performance based when appropriate. The findings appeared to be good. The inspector discussed audits, FMRs, auditor selection and qualification, and response to findings with a Nuclear Quality Programs auditor. The inspector noted that the Chemistry program auditors were certified for these audits. The auditor stated that audit team leaders and members are selected based on their qualifications for the discipline being audited, and that the NQP auditors who performed these Chemistry FMRs audits had Chemistry related backgrounds or experience. The auditor also stated that the Chemistry group was extremely responsive to audit findings both

in timeliness and quality of response. The auditor is scheduled to spend two weeks of training in chemistry to observe "behind the scenes" aspects of this group's operation. The program appears to be effective.

No violations or deviations were identified.

6. Quality Assurance/Quality Control of Radiological Measurements (IP 84750)

The inspectors reviewed counting room Quality Control. The licensee performs required QC checks on the counting room instruments, logs the data and hand plots the results on control charts. The inspector noted that the checks were run as required, that the data appeared reasonable and that supervisory reviews of data were performed. Evidence of procedural adherence was noted during the inspection when on several occasions gamma spectrometers were declared out of service for having failed the daily QC check. The licensee recently implemented the use of an operational experience file for each counter and is in the process of developing machine trend plotting of daily results.

The inspectors also reviewed both the radiochemistry laboratory and count room operations, including physical facilities. Housekeeping was good. Count room space is ample. The Chemistry Technicians observed during sample acquisition and preparation used very good laboratory techniques.

The inspectors examined the last half of 1990 and the first half of 1991 results of the confirmatory measurements program the licensee participates in with an independent vendor. The licensee achieved all agreements for alpha, beta and gamma emitters.

No violations or deviations were identified.

7. 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 4.

8. Exit Interview

The scope and findings of the inspection were discussed with licensee representatives (Section 1) at the conclusion of the inspection on June 20, 1991. Licensee representatives did not identify any documents or processes reviewed during the inspection as proprietary.

Attachments:

1. Table 1, Radiological Confirmatory Measurements Program Results  
2nd Quarter 1990
2. Table 2, Radiological Confirmatory Measurements Program Results  
2nd Quarter 1991
3. Attachment 1, Criteria for Comparing Analytical Measurements

TABLE 1  
 U.S. NUCLEAR REGULATORY COMMISSION  
 REGION III  
 FACILITY: DRESDEN  
 FOR THE 2ND QUARTER OF 1991

SAMPLE	NUCLIDE	NRC VAL.	NRC ERR.	LIC.VAL.	LIC.ERR.	RATIO	RESOL.	RESULT
SPLIT	H-3	9.03E-04	1.10E-05	9.23E-04	0.00E+00	1.02	82.1	A
SAMPLE	FE-55	2.60E-07	3.00E-08	2.00E-07	0.00E+00	0.77	8.7	A
SPIKE	H-3	5.84E-05	2.30E-06	6.20E-05	0.00E+00	1.06	25.4	A
	SR-89	7.82E-05	3.10E-06	3.46E-05	0.00E+00	0.44	25.2	D
	SR-90	3.85E-06	1.50E-07	3.94E-06	0.00E+00	1.02	25.7	A
	FE-55	4.75E-05	1.90E-06	5.66E-05	0.00E+00	1.19	25.0	A

= AGREEMENT  
 = DISAGREEMENT  
 N = NO COMPARISON  
 \* = CRITERIA RELAXED

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.

TABLE 2  
 U.S. NUCLEAR REGULATORY COMMISSION  
 REGION III  
 FACILITY: DRESDEN  
 FOR THE 2ND QUARTER OF 1991

SAMPLE	NUCLIDE	NRC VAL.	NRC ERR.	LIC.VAL.	LIC.ERR.	RATIO	RESOL.	RESULT
GAS 28-P2002	KR-85M	1.38E-03	4.16E-05	1.40E-03	1.60E-04	1.01	33.2	A
	KR-87	1.02E-02	2.28E-04	9.00E-03	6.60E-04	0.88	44.7	A
	XE-133	4.16E-04	6.86E-05	4.90E-04	5.40E-05	1.18	6.1	A
	XE-135	7.36E-03	7.93E-04	6.70E-03	6.20E-04	0.91	9.3	A
	XE-135M	4.90E-02	1.31E-03	4.10E-02	6.70E-03	0.84	37.5	A
	XE-138	2.54E-01	3.48E-03	2.20E-01	2.70E-02	0.87	73.0	A
RCS 5-P45	NA-24	1.88E-04	5.99E-06	1.60E-04	1.40E-05	0.85	31.4	A
	MN-54	1.59E-05	3.11E-06	1.20E-05	2.40E-06	0.75	5.1	A
	CO-60	2.76E-04	6.78E-06	2.40E-04	1.50E-05	0.87	40.7	A
	AS-76	5.00E-04	1.02E-05	4.40E-04	4.30E-05	0.88	49.0	A
	MO-99	9.91E-05	2.27E-05	8.80E-05	1.70E-05	0.89	4.4	A
	I-132	1.52E-04	8.72E-06	1.20E-04	7.00E-06	0.79	17.4	A
	I-133	5.72E-05	3.95E-06	4.80E-05	4.90E-06	0.84	14.5	A
	I-134	5.64E-04	7.06E-05	5.60E-04	3.50E-05	0.99	8.0	A
	I-135	1.51E-04	1.48E-05	1.30E-04	8.00E-06	0.86	10.2	A
	SR-92	2.56E-04	9.17E-06	2.10E-04	3.20E-05	0.82	27.9	A
	CS-138	1.58E-04	1.73E-05	1.20E-04	1.80E-05	0.76	9.1	A
BA-139	4.04E-04	3.56E-05	3.20E-04	0.00E+00	0.79	11.3	A	
CHARCOAL	I-131	1.09E-11	5.69E-13	1.20E-11	1.20E-12	1.10	19.2	A
	I-132	2.00E-11	6.07E-12	1.40E-11	4.50E-12	0.70	3.3	N
	I-133	4.53E-11	1.66E-12	4.50E-11	4.60E-12	0.99	27.3	A
	I-135	5.18E-11	6.48E-12	5.10E-11	5.00E-12	0.98	8.0	A
CHARCOAL	I-131	1.11E-11	6.90E-13	1.10E-11	1.10E-12	0.99	16.1	A
	I-132	2.59E-11	1.19E-11	2.20E-11	4.40E-12	0.85	2.2	N
	I-133	4.92E-11	1.57E-12	5.30E-11	5.10E-12	1.08	31.3	A
	I-135	6.65E-11	9.82E-12	5.50E-11	4.70E-12	0.83	6.8	A
L.WASTE 25-6543	CO-60	1.13E-06	1.07E-07	1.30E-06	1.00E-07	1.15	10.6	A
	MN-54	2.92E-07	5.80E-08	2.80E-07	5.00E-08	0.96	5.0	A
	CS-137	3.24E-07	6.33E-08	2.20E-07	4.10E-08	0.68	5.1	A

SAMPLE	NUCLIDE	NRC VAL.	NRC ERR.	LIC.VAL.	LIC.ERR.	RATIO	RESOL.	RESULT
L. WASTE	CO-60	1.04E-06	1.06E-07	1.30E-06	9.00E-08	1.25	9.8	A
28-P2002	CS-137	2.95E-07	4.92E-08	2.60E-07	3.80E-08	0.88	6.0	A
PRIMARY	NA-24	1.87E-04	6.96E-06	1.60E-04	1.40E-05	0.86	26.9	A
28-P2002	CO-60	2.94E-04	7.28E-06	2.40E-04	1.40E-05	0.82	40.4	A
	AS-76	4.90E-04	1.08E-05	4.50E-04	4.30E-05	0.92	45.4	A
	BA-141	6.01E-04	4.48E-05	5.40E-04	9.40E-05	0.90	13.4	A
	I-132	1.15E-04	6.73E-06	1.20E-04	7.00E-06	1.04	17.1	A
	I-133	7.22E-05	5.14E-06	6.40E-05	6.60E-06	0.89	14.0	A
	I-134	5.50E-04	5.25E-05	5.30E-04	2.70E-05	0.96	10.5	A
	I-135	1.40E-04	1.59E-05	1.40E-04	8.00E-06	1.00	8.8	A
	SR-91	7.85E-05	1.50E-05	5.10E-05	6.20E-06	0.65	5.2	A
	SR-92	2.61E-04	9.20E-06	2.10E-04	3.17E-05	0.80	28.4	A
	MO-99	1.47E-04	3.33E-05	1.20E-04	1.70E-05	0.82	4.4	A
	CS-138	1.60E-04	1.21E-05	1.20E-04	1.10E-05	0.75	13.2	A
	BA-139	4.25E-04	3.45E-05	3.69E-04	0.00E+00	0.87	12.3	A
GAS	KR-85M	1.40E-03	3.55E-05	1.40E-03	9.00E-05	1.00	39.4	A
26-P45	KR-87	9.69E-03	2.27E-04	8.80E-03	6.30E-04	0.91	42.7	A
	KR-88	5.11E-03	1.38E-04	5.30E-03	3.30E-04	1.04	37.0	A
	XE-133	6.40E-04	7.50E-05	6.40E-04	6.50E-05	1.00	8.5	A
	XE-135	9.10E-03	8.00E-05	8.30E-03	5.00E-04	0.91	113.8	A
	XE-135M	5.78E-02	3.02E-03	4.80E-02	7.40E-03	0.83	19.1	A
	XE-138	2.38E-01	8.40E-03	2.10E-01	2.50E-02	0.88	28.3	A
L. WASTE	NA-24	2.70E-06	2.05E-07	2.30E-06	2.40E-07	0.85	13.2	A
25-6543	CR-51	3.94E-06	1.59E-06	4.50E-06	1.36E-06	1.14	2.5	N
	MN-54	1.87E-05	3.89E-07	1.70E-05	1.50E-06	0.91	48.1	A
	CO-60	5.24E-05	5.89E-07	4.70E-05	2.80E-06	0.90	89.0	A
	AS-76	2.29E-06	3.59E-07	2.00E-06	2.70E-07	0.87	6.4	A
	I-131	7.71E-07	1.88E-07	5.10E-07	1.44E-07	0.66	4.1	A
	I-132	2.51E-06	2.96E-07	2.70E-06	2.40E-07	1.08	8.5	A
	I-133	6.17E-06	2.00E-07	5.90E-06	5.70E-07	0.96	30.9	A
	I-135	9.60E-06	7.80E-07	7.90E-06	5.40E-06	0.82	12.3	A
	SR-91	1.93E-06	9.66E-07	2.80E-06	4.50E-07	1.45	2.0	N
	SR-92	2.61E-06	2.40E-07	1.90E-06	3.25E-07	0.73	10.9	A
	CS-137	8.01E-06	3.26E-07	7.20E-06	6.60E-07	0.90	24.6	A
L. WASTE	NA-24	2.58E-06	2.08E-07	2.30E-06	2.30E-07	0.89	12.4	A
28-P2002	MN-54	1.91E-05	4.52E-07	1.70E-05	1.50E-06	0.89	42.3	A
	CO-60	5.18E-05	7.16E-07	4.60E-05	2.80E-06	0.89	72.3	A
	AS-76	2.22E-06	4.26E-07	2.10E-06	2.60E-07	0.95	5.2	A
	I-132	2.60E-06	4.91E-07	2.60E-06	2.30E-07	1.00	5.3	A
	I-133	6.10E-06	2.61E-07	6.20E-06	6.40E-07	1.02	23.4	A
	I-135	8.12E-06	1.06E-06	7.70E-06	4.80E-07	0.95	7.7	A
	SR-92	1.52E-06	3.24E-07	1.80E-06	3.04E-07	1.18	4.7	A
	CS-137	8.00E-06	3.41E-07	7.70E-06	6.90E-07	0.96	23.5	A



SAMPLE	NUCLIDE	NRC VAL.	NRC ERR.	LIC.VAL.	LIC.ERR.	RATIO	RESOL.	RESULT
RCS	CR-51	4.84E-05	1.74E-06	4.70E-05	4.70E-06	0.97	27.8	A
CRUD	MN-54	1.84E-04	8.59E-07	1.90E-04	1.60E-05	1.03	214.2	A
25-6543	FE-59	9.91E-05	1.19E-06	1.00E-04	6.00E-06	1.01	83.3	A
	CO-58	1.26E-05	3.72E-07	1.20E-05	1.20E-06	0.95	33.9	A
	CO-60	6.45E-05	5.75E-07	6.90E-05	4.20E-06	1.07	112.2	A
	ZN-65	2.41E-06	5.13E-07	0.00E+00	0.00E+00		4.7	D
	AS-76	5.55E-05	1.12E-05	9.10E-05	1.60E-05	1.64	5.0	A
	HF-181	1.45E-06	2.25E-07	1.70E-06	3.80E-07	1.17	6.4	A
	NB-95	1.27E-06	2.52E-07	1.70E-06	3.70E-07	1.34	5.0	A
	RU-103	8.54E-07	2.12E-07	1.00E-06	3.00E-07	1.17	4.0	A
	SB-122	6.85E-06	9.95E-07	7.10E-06	1.31E-06	1.04	6.9	A
	SB-124	3.63E-06	2.95E-07	4.40E-06	4.00E-07	1.21	12.3	A
	CE-144	6.62E-06	5.93E-07	7.10E-06	1.31E-06	1.07	11.2	A
RCS	CR-51	4.84E-05	1.74E-06	5.30E-05	5.10E-06	1.10	27.8	A
CRUD	MN-54	1.84E-04	8.59E-07	2.00E-04	1.70E-05	1.09	214.2	A
26-P45	FE-59	9.91E-05	1.19E-06	1.10E-04	7.00E-06	1.11	83.3	A
	CO-58	1.26E-05	3.72E-07	1.40E-05	1.30E-06	1.11	33.9	A
	CO-60	6.45E-05	5.75E-07	7.20E-05	4.40E-06	1.12	112.2	A
	ZN-65	2.41E-06	5.13E-07	2.20E-06	4.90E-07	0.91	4.7	A
	AS-76	5.55E-05	1.12E-05	8.00E-05	1.15E-05	1.44	5.0	A
	HF-181	1.45E-06	2.25E-07	1.30E-06	2.70E-07	0.90	6.4	A
	NB-95	1.27E-06	2.52E-07	1.40E-06	3.00E-07	1.10	5.0	A
	RU-103	8.54E-07	2.12E-07	1.10E-06	2.80E-07	1.29	4.0	A
	SB-122	6.85E-06	9.95E-07	6.50E-06	9.70E-07	0.95	6.9	A
	SB-124	3.63E-06	2.95E-07	4.60E-06	3.70E-07	1.27	12.3	A
	CE-144	6.62E-06	5.93E-07	7.50E-06	1.29E-06	1.13	11.2	A

A = AGREEMENT  
D = DISAGREEMENT  
N = NO COMPARISON  
\* = CRITERIA RELAXED