U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-315/87030(DRSS); 50-316/87030(DRSS)

Dockets No. 50-315; 50-316 Licenses No. DPR-58; DPR-74

Licensee: Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43216

Facility Name: D. C. Cook Nuclear Plant, Units 1 and 2

Inspection At: D. C. Cook Site
Bridgeman, Michigan

Inspection Conducted: November 3-6, 12 and 13, 1987

Inspectors: A. Januska 12/1/87
Date

Accompanied By: R. Bocanegra

Approved By: M. C. Schumacher, Chief 12/1/87
Radiological Effluents Date
and Chemistry Section

Inspection Summary

Inspection on November 3-6, 12 and 13, 1987 (Reports No. 50-315/87030(DRSS); No. 50-316/87030(DRSS))
Areas Inspected: Routine announced inspection of quality assurance and confirmatory measurements for in-plant radiochemical analyses.
Results: No violations or deviations were identified during this inspection.

DETAILS

1. Persons Contacted

[1]A. Blind, Assistant Plant Manager, Operations and Administration
[1]L. Gibson, Assistant Plant Manager, Technical Support
[1]M. Gumm, Technical Physical Science, Administrative Compliance Coordinator
[1,2]K. Haglund, Technical Physical Science, Chemistry Supervisor
[1]M. Horvath, AEPSC, Site QA Supervisor
[1]T. Kriesel, Technical Physical Science, Superintendent
[1]W. Smith, Jr., Plant Manager
[1]K. Wojcik, Technical Physical Science, Plant Chemical Supervisor

[1]Denotes those present at the exit meeting.
[2]Present during telephone conversation on November 12 and 13, 1987.

2. Confirmatory Measurements

a. Quality Assurance

The inspectors reviewed the radioactivity measurements laboratory quality assurance program including the physical facilities, laboratory operations, and procedures. All the counting equipment was found to be in good working order. Pertinent laboratory operating procedures found in 12 THP 6020 LAB were reviewed by the inspectors. A detailed review of annual calibration procedures 12 THP 6020 LAB.073, LAB.074, and LAB.140 was performed. Other procedures reviewed included daily, weekly, and monthly Quality Control checks (LAB.088), laboratory surveillance (LAB.100), particulate counting (LAB.085), gamma analysis (LAB.0141) gross beta-gamma determination (LAB.047), and Quality Assurance (LAB.044). There were no problems observed in these procedures.

The inspectors also reviewed Quality Control records and related supporting documentation. Documents inspected included weekly Chi Square Test results, daily Q.C. results for germanium detectors for the last three months, check source decay graphs for daily Q.C. checks, and G.M., P.C., germanium detector, and liquid scintillation counter calibration. All records inspected were found to be in accordance with 12 THP 6020 LAB procedures.

Based on information used to compare the results of the licensee's six day iodine stack sample, the inspectors questioned the licensee's decay correction during long sample collection times. After reviewing the spectroscopy system software manual the inspectors found that the licensee was using a decay time that, for short-lived nuclides, would cause the software to over report activity present in a sample. The licensee consulted with the system vendor and a solution has been devised based on the inspectors' finding. The

licensee will temporarily apply a correction factor to short-lived nuclides collected over long sample periods until permanent software changes have been made.

b. Sample Split

Seven samples (air particulate, charcoal adsorber, spiked air particulate, spiked charcoal adsorber, reactor coolant, liquid waste, and gas) were analyzed for gamma emitting isotopes by the licensee and in the Region III Mobile Laboratory on site. A spiked air particulate filter and a spiked charcoal adsorber were analyzed after no activity was detected on a plant particulate stack sample and only I-131 detected on an adsorber stack sample. Both spikes were treated as actual samples.

Comparisons were made on combinations of two count room detectors and the licensee's Emergency Counting Facility detector. Results of the sample comparisons are given in Table 1; the comparison criteria are given in Attachment 1. The licensee achieved 74 agreements out of 75 comparisons.

The lone disagreement, Ce-139 in primary coolant occurred on Detector 2 after having been accurately quantified on Detector 3. Examination of the peak printout revealed that the 165 keV peak was not present on the recount. The licensee plans to relax the system sensitivity and recall the spectrum to determine if the peak is quantifiable in the presence of adjacent peaks.

A gas sample collected and analyzed yielded two disagreements and exhibited an apparent conservative bias by the licensee. In order to verify if the bias was systematic and resolve the disagreements, a second sample was collected and the results compared against the NRC's recently certified gas bulb geometry. Although agreements, five of six comparisons remained conservative and of approximately the same magnitude as the first comparison. The licensee is in possession of a new gas standard as part of a routine complete calibration of Detector 3 and has agreed to completely recalibrate Detector 3 and recalibrate Detector 1's gas geometry by November 30, 1987. (Open Items No. 50-315/87030-01; No. 50-316/87030-01)

A portion of a monitor tank sample will be analyzed for gross beta, H-3, Sr-89, Sr-90, and Fe-55 and the results reported to Region III for comparison with an analysis by the NRC Reference Laboratory on a split of the sample. (Open Items No. 50-315/87030-02; No. 50-316/87030-02)

The inspectors examined procedure 12 THP 6020 LAB.048, Revision 4, for accuracy of $E\beta$ and $E\gamma$ values used in the required EBAR determination for the reactor coolant system. The inspectors found that Table I is in error , primarily for the beta particles, as is the suggested calculational statement in Section 6.3. The licensee agreed to correct Table I, apply the corrected values to the last two Technical Specifications (T/S) required EBAR determinations to determine (T/S) compliance and inform the inspectors of the results. (Open Items No. 50-315/87030-03; No. 50-316/87030-03)

c. Audits

The inspectors reviewed surveillances No. 12-87-43, No. 12-87-119 and No. 12-87-138 and audits QA-87-07 and QA-87-23. No findings relevant to this inspection were noted.

3. 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 3.b.

4. Exit Meeting

The inspectors met with licensee representatives denoted in Section 1 at the conclusion of the inspection on November 6, 1987. The scope and findings of the inspection were discussed.

During the inspection the inspectors 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. Table 1, Confirmatory Measurements Program Results, 4th Quarter 1987
2. Attachment 1, Criteria for Comparing Analytical Measurements

TABLE 1

U S NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

CONFIRMATORY MEASUREMENTS PROGRAM
FACILITY: DC COOK
FOR THE 4 QUARTER OF 1987

		------NRC-------		----LICENSEE----		---LICENSEE:NRC----		
SAMPLE	ISOTOPE	RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
C SPIKED DET 1	CO-57	7.2E-03	1.2E-04	8.2E-03	1.4E-04	1.1E 00	5.9E 01	A
	CO-60	1.5E-02	3.9E-04	1.7E-02	5.4E-04	1.2E 00	3.7E 01	A
	Y-88	4.0E-03	2.5E-04	3.9E-03	2.9E-04	9.9E-01	1.6E 01	A
	CD-109	4.3E-01	4.5E-03	4.7E-01	6.1E-03	1.1E 00	9.5E 01	A
	SN-113	3.0E-03	2.3E-04	3.6E-03	2.8E-04	1.2E 00	1.3E 01	A
	CS-137	2.5E-02	4.3E-04	2.9E-02	5.4E-04	1.2E 00	5.9E 01	A
	CE-139	2.5E-03	9.6E-05	2.9E-03	9.7E-05	1.2E 00	2.6E 01	A
F SPIKED DET 1	CO-57	7.3E-03	9.1E-05	7.6E-03	1.2E-04	1.0E 00	8.0E 01	A
	CO-60	1.6E-02	9.3E-04	1.6E-02	4.5E-04	1.0E 00	1.7E 01	A
	Y-88	4.1E-03	1.9E-04	3.5E-03	2.4E-04	8.5E-01	2.2E 01	A
	CD-109	4.5E-01	3.3E-03	4.5E-01	5.2E-03	1.0E 00	1.4E 02	A
	SN-113	3.4E-03	1.7E-04	3.0E-03	1.7E-04	8.8E-01	2.0E 01	A
	CS-137	2.9E-02	3.5E-04	2.7E-02	4.4E-04	9.5E-01	8.1E 01	A
	CE-139	2.5E-03	7.3E-05	2.6E-03	7.8E-05	1.0E 00	3.4E 01	A
L WASTE DET 2	MN-54	8.2E-07	8.8E-08	8.4E-07	5.0E-08	1.0E 00	9.3E 00	A
	CO-58	1.0E-05	1.7E-07	9.5E-06	1.6E-07	9.4E-01	6.1E 01	A
	CO-60	1.4E-06	9.2E-08	1.5E-06	5.5E-08	1.0E 00	1.5E 01	A
	AG-110M	5.4E-06	1.9E-07	4.6E-06	1.5E-07	8.4E-01	2.8E 01	A
	I-131	7.5E-07	1.5E-07	8.5E-07	1.1E-07	1.1E 00	5.1E 00	A
	CS-134	6.2E-05	3.6E-07	5.7E-05	6.7E-07	9.2E-01	1.7E 02	A
	CS-137	7.1E-05	3.7E-07	6.6E-05	0.0E-01	9.2E-01	1.9E 02	A
	XE-133	2.0E-06	2.0E-07	2.5E-06	2.5E-07	1.2E 00	1.0E 01	A
F SPIKED DET 2	CO-57	7.3E-03	9.1E-05	7.4E-03	8.5E-05	1.0E 00	8.0E 01	A
	CO-60	1.6E-02	3.2E-04	1.5E-02	3.3E-04	9.7E-01	4.9E 01	A
	Y-88	4.1E-03	1.9E-04	3.5E-03	1.7E-04	8.6E-01	2.2E 01	A
	CD-109	4.5E-01	3.3E-03	4.3E-01	3.2E-03	9.6E-01	1.4E 02	A
	SN-113	3.4E-03	1.7E-04	3.1E-03	1.2E-04	9.1E-01	2.0E 01	A
	CS-137	2.9E-02	3.5E-04	2.6E-02	3.3E-04	9.2E-01	8.1E 01	A
	CE-139	2.5E-03	7.3E-05	2.6E-03	6.3E-05	1.0E 00	3.4E 01	A

T TEST RESULTS:
A=AGREEMENT
D=DISAGREEMENT
C=CRITERIA RELAXED
N=NO COMPARISON

TABLE 1

U S NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

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FACILITY: DC COOK
FOR THE 4 QUARTER OF 1987

		------NRC-------		----LICENSEE----		---LICENSEE:NRC----		
SAMPLE	ISOTOPE	RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
C SPIKED DET 2	CO-57	7.2E-03	1.2E-04	8.2E-03	1.1E-04	1.1E 00	5.9E 01	A
	CO-60	1.5E-02	3.9E-04	1.7E-02	3.9E-04	1.1E 00	3.7E 01	A
	Y-88	4.0E-03	2.5E-04	3.8E-03	2.0E-04	9.7E-01	1.6E 01	A
	CD-109	4.3E-01	4.5E-03	4.7E-01	3.9E-03	1.1E 00	9.5E 01	A
	SN-113	3.0E-03	2.3E-04	3.6E-03	1.5E-04	1.2E 00	1.3E 01	A
	CS-137	2.5E-02	4.3E-04	3.0E-02	4.1E-04	1.2E 00	5.9E 01	A
	CE-139	2.5E-03	9.6E-05	2.8E-03	7.8E-05	1.1E 00	2.6E 01	A
L WASTE DET 3	MN-54	9.0E-07	1.0E-07	8.2E-07	4.7E-08	9.0E-01	9.0E 00	A
	CO-58	1.0E-05	1.7E-07	9.7E-06	1.5E-07	9.5E-01	5.8E 01	A
	CO-60	1.4E-06	9.7E-08	1.5E-06	5.8E-08	1.0E 00	1.5E 01	A
	AG-110M	5.8E-06	1.9E-07	4.6E-06	1.6E-07	7.9E-01	3.1E 01	A
	I-131	9.8E-07	1.6E-07	8.1E-07	9.3E-08	8.2E-01	6.2E 00	A
	CS-134	6.2E-05	3.7E-07	5.7E-05	7.1E-07	9.3E-01	1.7E 02	A
	CS-137	7.1E-05	3.7E-07	6.6E-05	7.7E-07	9.3E-01	1.9E 02	A
	XE-133	2.0E-06	2.4E-07	2.3E-06	2.2E-07	1.1E 00	8.4E 00	A
PRIMARY DET 3	I-131	3.1E-03	8.3E-05	3.0E-03	9.5E-05	9.6E-01	3.7E 01	A
	I-132	8.5E-03	9.4E-05	8.0E-03	3.7E-04	9.4E-01	9.1E 01	A
	I-133	7.7E-03	7.4E-05	7.6E-03	1.5E-04	9.8E-01	1.0E 02	A
	I-134	1.2E-02	3.3E-04	1.3E-02	2.6E-04	1.1E 00	3.5E 01	A
	I-135	9.7E-03	3.0E-04	9.2E-03	3.0E-04	9.5E-01	3.3E 01	A
	RB-88	2.0E-01	5.1E-03	1.9E-01	7.7E-03	9.2E-01	4.0E 01	A
	Y-88	1.6E-03	6.8E-05	1.6E-03	6.5E-05	9.9E-01	2.4E 01	A
	RU-106	6.3E-03	5.3E-04	6.0E-03	5.4E-04	9.7E-01	1.2E 01	A
	CS-134	6.7E-03	6.6E-05	6.6E-03	1.2E-04	1.0E 00	1.0E 02	A
	CS-137	7.6E-03	8.7E-05	6.9E-03	3.0E-04	9.0E-01	8.8E 01	A
	CS-138	4.8E-02	6.0E-04	4.7E-02	9.1E-04	9.8E-01	8.0E 01	A
	CE-139	2.8E-04	4.2E-05	2.4E-04	6.0E-05	8.6E-01	6.7E 00	A
	NA-24	2.0E-03	6.0E-04	1.7E-03	8.5E-05	8.5E-01	3.4E 00	A
OFF GAS DET 3	KR-85M	1.7E-06	3.2E-07	2.2E-06	6.6E-08	1.3E 00	5.4E 00	A

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		------NRC-------		----LICENSEE----		---LICENSEE:NRC----		
SAMPLE	ISOTOPE	RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
OFF GAS	XE-133	3.1E-05	1.1E-06	3.7E-05	3.4E-07	1.2E 00	2.9E 01	A
	XE-135	1.1E-05	5.9E-07	1.1E-05	1.3E-07	1.0E 00	1.9E 01	A
PRIMARY	I-131	3.0E-03	8.6E-05	3.0E-03	9.5E-05	1.0E 00	3.5E 01	A
DET 2	I-132	8.5E-03	1.0E-04	8.6E-03	2.6E-04	1.0E 00	8.3E 01	A
	I-133	7.8E-03	7.0E-05	7.2E-03	1.5E-04	9.3E-01	1.1E 02	A
	I-134	1.2E-02	3.8E-04	1.3E-02	3.4E-04	1.1E 00	3.0E 01	A
	I-135	9.7E-03	2.6E-04	8.6E-03	3.1E-04	8.9E-01	3.7E 01	A
	Y-88	9.1E-04	5.1E-05	8.4E-04	5.7E-05	9.3E-01	1.8E 01	A
	RU-106	3.2E-03	3.8E-04	3.5E-03	5.2E-04	1.1E 00	8.2E 00	A
	CE-134	6.7E-03	5.9E-05	6.0E-03	1.0E-04	8.9E-01	1.1E 02	A
	CS-137	7.6E-03	7.0E-05	7.1E-03	1.8E-04	9.4E-01	1.1E 02	A
	CS-138	4.8E-02	1.2E-03	4.7E-02	1.4E-03	9.8E-01	4.0E 01	A
	CE-139	1.8E-04	3.3E-05	0.0E-01	0.0E-01	0.0E-01	5.3E 00	D
OFF GAS	KR-85M	3.2E-06	3.9E-07	2.2E-06	1.0E-07	6.9E-01	8.2E 00	A
DET 1	XE-133	3.3E-05	1.1E-06	3.9E-05	1.1E-06	1.2E 00	2.9E 01	A
	XE-135	1.2E-05	5.7E-07	1.2E-05	1.8E-07	1.0E 00	2.0E 01	A
C FILTER	I-131	3.9E-13	3.7E-14	2.5E-13	0.0E-01	6.4E-01	1.1E 01	A

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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.

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.