

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-315/82-01; 50-316/82-01

Docket Nos. 50-315; 50-316

License Nos. DPR-58; DPR-74

Licensee: American Electric Power Service Corporation  
Indiana and Michigan Power Company  
2 Broadway  
New York, NY 10004

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

Inspection At: Donald C. Cook Site, Bridgman, MI

Inspection Conducted: January 12-15 and 22, 1982

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Inspectors: M. J. Oestmann

2/10/82

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for S. Rozak

2/11/82

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Inspection Summary

Inspection on January 12-15 and 22, 1982 (Report Nos. 50-315/82-01;  
50-316/82-01)

Areas Inspected: Routine, announced inspection of: (1) Confirmatory Measurements including collection of samples which were split with the licensee and analyzed at the Region III office in Glen Ellyn, Illinois, and discussion of results; quality control of analytical measurements and internal audits; (2) radiological environmental monitoring program implementation and results; and (3) review of corrective actions taken on previous inspection findings. The inspection involved 44 inspector-hours onsite by two NRC inspectors.

Results: No items of noncompliance or deviations were identified.

## DETAILS

### 1. Persons Contacted

- \*\*W. G. Smith, Jr., Plant Manager
- \*\*E. L. Townley, Assistant Plant Manager
- \*B. A. Svensson, Assistant Plant Manager
- \*E. A. Smarrella, Technical Supervisor
- \*J. F. Stieltzel, Quality Assurance Supervisor
- T. Beilman, Quality Assurance Engineer
- \*\*J. Wojcik, Plant Chemical Supervisor
- J. Ersland, Chemical Supervisor
- W. Lentz, Chemical Foreman
- D. Avery, Senior Chemical Technician
- \*D. Palmer, Radiation Protection Supervisor
- J. Fryer, Radiation Protection Foreman
- H. Springer, Radiation Protection Technician

The inspectors also interviewed several other licensee employees during the course of this inspection, including chemistry and health physics personnel, members of the security force, and general office personnel.

\*Denotes those present at the exit interview on January 15, 1982.

\*\*Denotes those present during the telephone conversation on January 22, 1982.

### 2. Licensee Action on Previous Inspection Findings

- a. (Open) Open Item (50-315/78-06-02): NRC concern about the licensee's laboratory capability to accurately measure Sr-89 and Sr-90 in effluent samples and NRC spiked samples. The licensee no longer analyzes for Sr-89 and Sr-90 in his laboratory but has a contract with the Eberline Instrument Corporation to perform these analyses. Licensee results of the analysis for Sr-89 in a liquid waste sample split with the NRC during the fourth quarter of 1980 (Table 1) showed an agreement with the results from the NRC Reference Laboratory. Although no comparison for Sr-90 in this sample could be made since the concentration of this radionuclide was below the criteria used for comparison, the licensee's result was approximately seven times higher than the value obtained by the NRC Reference Laboratory. Another liquid waste sample was collected and split with the licensee during this inspection and will be analyzed for Sr-89 and Sr-90 by the licensee's contractor and the NRC Reference Laboratory, and the results compared. This item will remain open, pending demonstration that the licensee can accurately measure Sr-90.
- b. (Closed) Open Item (50-315/78-26-01; 50-316/78-25-01): Check the efficiency curve to determine if one parabola for the calibration of the GeLi detector is skewed and consider employing the service of a consultant to work with plant personnel to identify and eliminate the problems in the laboratory. The licensee has recalibrated his GeLi detector system and now is using an

Amerxham Searle standard with ten discrete energies for daily QC checks rather than a one point Cs-137 check source. In addition the licensee arranged for Chem-Nuclear Systems, Inc., to audit the confirmatory measurements program including sample comparison results in April 2, 1979. The licensee has implemented the recommendations of the audit. Licensee analytical results for the fourth quarter of 1980 showed 16 agreements or possible agreements of gamma emitters out of 16 comparisons. This item is considered closed.

- c. (Closed) Open Item (50-315/80-22-01; 50-316/80-18-01): Confirmatory Measurement of spiked particulate sample. The licensee counted a spiked particulate sample on his GeLi detector in 1981. The results are shown in Table 1. The licensee had two agreements and two possible agreements. This item is considered closed.
- d. (Open) Open Item (50-315/80-22-03; 50-316/80-18-03): The licensee agreed to count samples for gross beta at 1:00 pm EST on January 14, 1981-the same time it would be counted by the NRC Reference Laboratory. Discussions with the licensee indicated that this sample was not counted on the agreed-upon day which probably accounts for the disagreement noted in Table 1. The difference in counting time precluded a valid comparison for the gross beta. This item remains open, pending the outcome of comparing gross beta results from the liquid sample collected during this inspection. No comparisons for tritium, Sr-89, Sr-90 and gross beta in a second liquid sample collected during December 1980 could be made because concentrations were below the criteria used for comparisons.
- e. (Closed) Unresolved Item (50-315/81-21-04; 50-316/81-24-04): Location of the licensee's offsite monitoring (TLD's) did not satisfy guidance of NRR Radiological Assessment Branch Technical Position, Revision 1, November 1979. The licensee has placed additional TLD's in the outer ring for a total of 23 onsite and offsite locations. The inspectors have no further questions regarding this item. This item is considered closed.
- f. (Closed) Open Item (50-315/80-06-01; 50-316/80-05-02): Monitor tritium monthly in onsite ground water wells Nos. 4,5, and 6 for a period of six months from the date of the April 21-25, 1980, inspection. Monthly well samples collected by the licensee's contractor during the eight month period following the inspection showed tritium levels (400 to 3200 pCi/l) which were above the background level of approximately 200 to 400 pCi/l but much less than the maximum permissible concentrations (10 CFR Part 20, Appendix B, Table II) of 3,000,000 pCi/l. These wells are not used for drinking purposes. During this inspection the inspection collected a well water sample from No. 6 well and an in-plant drinking water sample for tritium analysis by the NRC Reference Laboratory.

3. General

This inspection consisted of an examination of the licensee's radiological environmental monitoring program (REMP) including management controls; program results, sampling locations and observation of the monitoring equipment; and quality control of sampling and analytical results. Quality control of the licensee's chemistry and radiochemistry program for the confirmatory measurements program was also reviewed. Samples of liquid waste, charcoal adsorber, particulate filter, and gaseous waste were collected and split with the licensee for the confirmatory measurements program.

The licensee's Section 4.2 of Appendix B, Environmental Technical Specifications (ETS) was used as the primary inspection criteria for the REMP.

4. Management Controls

The licensee's administrative and procedural controls for the REMP were reviewed. The Radiation Protection Supervisor is responsible for the REMP and the contract with Eberline Instrument Corporation. The contractor has arranged for a local individual to collect samples and ship them to the Eberline Midwest Facilities in West Chicago, Illinois for analysis. The Radiation Protection Supervisor submits to the contractor a schedule for sample collection for a six month period in accordance with technical specification requirements.

The collector is instructed to note any problems found at the sampling stations on his weekly collection sheet. The sheet accompanies the samples sent to Eberline and a copy is given to the Radiation Protection Supervisor for his review. Licensee representatives also said that annual maintenance is performed on equipment at the sampling stations.

The Plant Chemistry Supervisor has the responsibility for the sampling and analysis of plant chemical and radiochemical samples. Both the Radiation Protection and the Plant Chemistry Supervisors report to the Technical Supervisor.

No items of noncompliance or deviations were identified.

5. Radiological Environmental Monitoring Program (REMP)

The REMP results for CY 1980 and for the first half of 1981 presented in the Annual Environmental Operating Report and monthly reports were reviewed to ensure compliance with ETS 4.2. Anomalies included fallout effects from weapons testing by the Republic of China on air particulate samples and the elevated tritium levels found in the licensee's ground water monitoring program discussed in Paragraph 2f.

Review of data sheets and reports show all samples had been accounted for and the appropriate analysis conducted. However, review of the maps for sample locations in the 1980 annual report showed that they were not current. The inspectors discussed this matter with licensee representatives who presented the inspectors with copies of updated maps. These

will be incorporated in the 1981 annual report to be issued in 1982. These maps include location of newly placed TLD's and new locations of milk sample stations. The inspectors determined that the licensee failed to provide documentation for conducting an annual survey in 1980 during the grazing season to confirm that no milk producing cows are closer than the closest cow now sampled. Although the licensee reported that he had contacted the local U.S. Department of Agriculture Extension Office, the licensee was unable to find a record of the conversation. The licensee agreed to provide documentation of future surveys. (Open item - 50-315/82-01-01; 50-316/82-01-01).

During a tour of selected air monitoring stations, the inspectors observed that a TLD was missing from station No. 4 and that the glass on the air sampler vacuum gauge at station No. 6 was broken and the muffler broken off. A licensee representative stated these problems would be corrected promptly. The sample collection sheet, filled out by the sample collector for the week of the inspection, was not available for inspector review, so that promptness of management response to these problems could not be judged. This question will be examined during a subsequent inspection. (Open item 50-315/82-01-02; 50-316/82-01-02).

The inspectors noted that annual calibration stickers were on the air monitoring equipment.

No items of noncompliance or deviations were identified.

6. Quality Control of Analytical Measurements

a. QC for the REMP

The inspectors reviewed the licensee's QC program utilized in the REMP, including a review of the licensee's contractor's QC manual and results of the contractor's participation in the EPA's inter-laboratory cross check program. The contractor also conducts a TLD intercomparison program in which the TLD's are irradiated in a known gamma field at Battelle Northwest Laboratories. Approximately 20 percent of analyses performed by the contractor are for internal QC purposes.

b. QC for the Chemistry and Radiochemistry Program

(1) Nonradiological Analysis of Reactor Coolant

Selected licensee chemical procedures and records for 1980 to date of this inspection related to nonradiological analysis of reactor coolant and secondary coolant were reviewed. Analytical procedures for ammonia, chloride, chromate, boron, fluoride, various metals, dissolved oxygen, hydrogen, hydrazine, pH and conductivity measurements were reviewed. All procedures appeared to be technically adequate and correct, with several revised in 1980 and 1981.

The inspectors toured the licensee's nonradiological chemistry laboratory and found all laboratory instruments were functional and calibrated. The licensee uses computer printouts each day for conducting the required daily, weekly, and monthly analyses and calibrations of equipment. The analytical data are recorded on appropriate data sheets. Both sets of documents are reviewed daily by the Plant Chemistry Supervisor. Any results out of specification are promptly reported to plant management. No technical problems were identified.

(2) Radiological Analysis of Reactor Coolant and Effluents

The inspectors reviewed selected procedures, records, computer printouts and data sheets for 1981 relating to radiological measurements of reactor coolant and effluents. These included analyses for gross beta-gamma and various radionuclides, sampling techniques for liquid and gaseous activities, calibration of counting equipment, including the licensee's multichannel analyzers.

A tour of the hot laboratory indicated an improvement in housekeeping was needed. During the collecting and handling of a reactor coolant sample split with the licensee for the confirmatory measurements program, the laboratory personnel accidentally spilled some solution on the floor. The proper health physics techniques were followed to ensure contamination was kept under control.

The counting room was also visited. Quality and functional checks of the existing counting equipment are conducted daily. Computer printouts are utilized to ensure the required calibrations are conducted on schedule. During the gamma spectroscopic analysis of a charcoal adsorber in the confirmatory measurements program the inspectors found that the licensee had miscalibrated his gamma spectroscopic system for one charcoal adsorber geometry on November 11, 1981. The licensee utilized the wrong side of the adsorber for his calibration. The error made his analytical results for this geometry conservative.

The licensee calibrates one gas geometry using a solid standard but does not do an absorption correction to reflect that the real samples are gaseous. This will tend to make analytical results conservative. The inspector also observed that the tops of the shields for the GeLi detector are not used to reduce background effects during routine counting. The inspectors learned that the licensee does not incorporate a decay correction during sampling time for samples that measure continuous release over extended periods of time. Air particulate and charcoal adsorbers on the vent stack that collect for one week per sample are an example. This will make the licensee's reported effluent releases non-conservative in some cases. These and other technical weaknesses in counting samples were discussed with licensee personnel during the exit interview.

(3) Quality Control of Laboratory Personnel

The licensee conducts a formal program for checking the quality of analytical measurements of plant chemistry. In particular, a program has been established to check the laboratory technician's results, e.g., QC analyses of standards, unknowns, spikes or blind samples of these measurements are conducted. Periodically a comparison of grab samples is made to determine the reproducibility of sampling methods. No problems were identified.

(4) Training of Chemistry Laboratory Personnel

Currently, the licensee trains chemistry personnel on-the-job. Such training includes supervisor observation of analytical measurements. The licensee is developing a 28 week long, three phase training program for upgrading the chemistry personnel experience. Lessons plans, examinations and laboratory test performances are included in the training program. This qualification and requalification program is just being implemented. No problems were identified.

(5) Licensee Internal Audits

The inspectors examined a report of an audit conducted by the licensee's QA Department from May 4 to August 28, 1981, of the chemistry and radiochemical program to assure adherence to procedures and technical specifications. Eight findings were identified in which seven were closed out by October 29, 1981, and a request for procedure revision for the eighth finding was filed. The QA Department is scheduled to conduct a followup audit on these corrective actions during 1982.

A licensee representative stated that an audit was conducted by the utility corporate QA Department of the Eberline Instrument Corporation's facilities in Santa Fe, New Mexico on December 1, 1980, and the Midwest Facilities in West Chicago, Illinois on October 27, 1980. The audit report was not available onsite for inspector review.

No items of noncompliance or deviations were identified.

7. Results of Split Sample Comparisons for the Confirmatory Measurements Program

During this inspection the licensee was asked to count a spiked air particulate filter and a spiked face-loaded charcoal adsorber supplied by the NRC inspectors. Samples were split from a liquid waste tank and a gas holdup tank. In addition, the licensee and the NRC inspectors counted a charcoal adsorber and an air particulate filter from a vent stack. The samples were counted by the licensee and approximately two days later by the inspectors at the Region III office in Glen Ellyn, Illinois. The Measurements Van was not used onsite due to hazardous driving conditions caused by inclement weather.

In addition a liquid sample was sent to the NRC Reference Laboratory to measure for tritium, gross beta, Sr-89, and Sr-90. The results of these analyses will be included in an addendum to this report.

The results of comparisons made during this inspection are given in Table II. Of 22 comparisons the licensees had 12 agreements or possible agreements. In almost all cases the licensee value is higher than the NRC value. The most probable explanation for this trend is the licensee's failure to correct for counting losses due to high counting rates. The licensee's calibration standards give a high "dead time" making his calculated efficiencies lower than they should be for samples with less activity.

No results are given in Table II for the air particulate from the vent because no activity was detected on the sample by the NRC. The licensee reported Co-60 on both this sample and on the charcoal adsorber from the vent. The licensee also failed to identify Xe-131m and Kr-85 in the gas sample. Both of the above may be an indication of excessive background which in one case is reported as spurious activity and in the other reflects MDA levels that are too high. The licensee also failed to identify Cs-136 in a liquid sample. Licensee representatives stated that gamma rays from Cs-136 were detected but this nuclide was not reported because some of these gammas have the same energies as those from other nuclides also in the sample and the identification of Cs-136 was thought to be spurious.

No items of noncompliance or deviations were identified.

#### 8. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of this inspection on January 15, 1982, and again telephonically with W. G. Smith, Jr., E. L. Townley and J. Wojcik on January 22, 1982. The licensee agreed to perform the following actions:

- A. Application of corrections for decay during sampling backfitting these corrections into the semi-annual effluent report for the 3rd and 4th quarters of 1980, and examination of previous records to ensure that no applicable limits were exceeded (Open item 50-315/82-01-03; 50-316/82-01-03);
- B. Incorporation of dead time corrections into his gamma spectroscopy systems and recalibration of at least one of his systems using these corrections by March 22, 1982 (Open item 50-315/82-01-04; 50-316/82-01-04);
- C. Correction of the charcoal adsorber calibration of November 11, 1981, and examination of past analytical results that used the faulty calibration (Open item 50-315/82-01-05; 50-316/82-01-05);
- D. Application of self-absorption corrections for the gas geometries in which the standard is not a gas (Open item 50-315/82-01-06; 50-316/82-01-06);



- E. Evaluation of the difference in background levels when counting with GeLi detector shields open and closed and, if significant, counting routinely with the shields closed (Open item 50-315/82-01-07; 50-316/82-01-07);
- F. Documentation of annual animal surveys (Paragraph 5) (Open item 50-315/82-01-01; 50-316/82-01-01);
- G. Give prompt attention to maintenance of air sampling stations. (Open item 50-315/82-01-02; 50-316/82-01-02); and
- H. Analysis of the liquid waste split sample taken on January 13, 1982 for tritium, Sr-89 and Sr-90, and gross beta (gross beta to be counted 12:00 noon EST on February 10, 1982) and report the results to Region III (Open item 50-315/82-01-08; 50-316/82-01-08).

The inspectors stated during the January 22, 1982 telephone discussion that additional comparisons would be made after the licensee recalibrates his GeLi counting system.

Attachments:

1. Table 1, Confirmatory Measurements  
Program, 4th Quarter of 1980
2. Table II, Confirmatory Measurements  
Program, 1st Quarter of 1982
3. Attachment 1, Criteria for Comparing  
Analytical Measurements

TABLE 1

U S NUCLEAR REGULATORY COMMISSION  
 OFFICE OF INSPECTION AND ENFORCEMENT  
 CONFIRMATORY MEASUREMENTS PROGRAM  
 FACILITY: DCCOOK  
 FOR THE 4 QUARTER OF 1980

SAMPLE	ISOTOPE	-----NRC-----		---LICENSEE---		---NRC:LICENSEE---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
L WASTE	H 3	4.4E-02	1.0E-04	4.9E-02	4.9E-03	1.1E+00	4.4E+02	A
	SR 89	3.1E-06	1.0E-07	3.2E-06	3.2E-07	1.0E+00	3.1E+01	A
	SR 90	4.0E-08	2.0E-08	2.7E-07	2.7E-08	6.7E+00	2.0E+00	N
	BETA	1.4E-04	5.0E-06	4.4E-04	4.4E-05	3.1E+00	2.8E+01	D
F SPIKED	CO 57	6.1E-05	2.0E-06	1.2E-04	2.3E-05	2.0E+00	3.1E+01	P
	CO 60	1.5E-03	4.0E-05	2.0E-03	9.8E-05	1.3E+00	3.8E+01	P
	CS 134	6.0E-04	3.0E-05	7.2E-04	4.5E-05	1.2E+00	2.0E+01	A
	CS 137	3.8E-03	1.2E-04	4.7E-03	1.1E-04	1.2E+00	3.2E+01	A

## T TEST RESULTS:

A=AGREEMENT

D=DISAGREEMENT

P=POSSIBLE AGREEMENT

N=NO COMPARISON

TABLE II  
 U. S. NUCLEAR REGULATORY COMMISSION  
 OFFICE OF INSPECTION AND ENFORCEMENT  
 CONFIRMATORY MEASUREMENTS PROGRAM  
 FACILITY: D.C. COOK  
 FOR THE 1 QUARTER OF 1982

SAMPLE	ISOTOPE	-----NRC-----		---LICENSEE---		---LICENSEE:NRC---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
OFF GAS	XE-131M	2.4E-04	2.7E-05	0.0E-01	0.0E-01	0.0E-01	8.9E 00	D
	XE-133	7.9E-02	2.6E-05	1.1E-01	4.2E-04	1.4E 00	3.0E 03	D
	XE-133M	4.6E-04	7.0E-06	3.8E-04	2.0E-04	8.3E-01	6.6E 01	A
	XE-135	2.9E-04	1.1E-05	3.5E-04	2.5E-05	1.2E 00	2.6E 01	A
	KR-85	1.0E-03	6.1E-05	0.0E-01	0.0E-01	0.0E-01	1.6E 01	D
L WASTE	MN-54	2.1E-05	5.6E-07	2.8E-05	5.6E-06	1.3E 00	3.7E 01	P
	CO-58	4.9E-03	4.0E-06	6.3E-03	2.6E-05	1.3E 00	1.2E 03	D
	CO-60	1.1E-04	7.9E-07	1.5E-04	6.1E-05	1.4E 00	1.4E 02	D
	CS-134	1.1E-04	8.2E-07	1.9E-04	1.5E-05	1.7E 00	1.3E 02	D
	CS-137	1.9E-04	1.0E-06	2.8E-04	1.2E-05	1.5E 00	1.9E 02	D
	SR-124	6.2E-05	1.0E-06	1.9E-04	1.5E-05	3.1E 00	6.2E 01	D
C FILTER	XE-133	5.3E-04	1.8E-05	6.6E-04	2.0E-05	1.3E 00	2.9E 01	A
F SPIKED	CO-57	4.4E 03	5.0E 01	5.8E 03	3.1E 02	1.3E 00	8.8E 01	P
	SN-113	8.5E 03	9.0E 01	1.2E 04	6.2E 03	1.4E 00	9.4E 01	D
	CS-137	2.5E 04	3.0E 02	3.1E 04	3.0E 02	1.2E 00	8.3E 01	A
	Y-88	6.2E 04	7.0E 02	5.9E 04	2.2E 04	9.5E-01	8.9E 01	A
	CO-60	3.9E 04	4.0E 02	5.0E 04	6.0E 02	1.3E 00	9.8E 01	P
D SPIKED	CO-57	1.1E 04	5.0E 02	2.2E 04	5.4E 02	2.0E 00	2.2E 01	P
	SN-113	2.1E 04	9.0E 02	3.0E 04	1.1E 04	1.4E 00	2.3E 01	P
	CS-137	6.2E 04	2.5E 03	1.0E 05	7.0E 02	1.6E 00	2.5E 01	P
	Y-88	1.6E 05	6.0E 03	2.6E 05	4.0E 04	1.6E 00	2.7E 01	P
	CO-60	9.8E 04	3.9E 03	1.7E 05	1.3E 03	1.7E 00	2.5E 01	D

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.