

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/84-21(DRSS)

Docket No. 50-255

License No. DRR-20

Licensee: Consumers Power Company
212 W. Michigan Ave.
Jackson, MI 49901

Facility Name: Palisades Nuclear Generating Plant

Inspection At: Palirades Site, Covert, MI

Inspection Conducted: October 1-5, 9, and 11, 1984

S. Rozak
Inspectors: S. Rozak

11/5/84
Date

M. J. Oestmann
M. J. Oestmann

11/5/84
Date

M. C. Schumacher
Approved By: M.C. Schumacher, Chief
Independent Measurements and
Environmental Protection Section

11/5/84
Date

Inspection Summary

Inspection on October 1-5, 9, and 11, 1984 (Report No. 50-255/84-21[DRSS])
Areas Inspected: Routine, unannounced inspection of: (1) the confirmatory measurements program, including sampling, quality control of analytical measurements, and comparison of licensee analysis with those of the Region III Mobile Laboratory and the NRC Reference Laboratory; (2) the radiological environmental monitoring program (REMP), including implementation and management controls; (3) training and qualifications; and (4) licensee internal audits of chemistry/radiochemistry and the REMP. The Region III Mobile Laboratory was onsite to analyze samples split with the licensee for comparison. The inspection involved 67 inspector-hours onsite by two NRC inspectors.
Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

- ¹T. P. Neal, Senior Health Physicist, Radiological Services Department (RSD), CPCo
- K. Penrod, Engineering Technician, RSD, CPCo
- M. Moore, Associate Health Physicist, RSD, CPCo
- J. Sarno, REMP Sample Collector, Teledyne Isotopes, Inc.
- ¹R. W. Montross, Plant Manager, Palisades
- ¹D. G. Malone, Licensing Engineer, Palisades
- W. P. Mullins, Chemistry/Health Physics Supervisor, Palisades
- ¹R. A. DeLong, Senior Health Physicist, Palisades
- ¹S. F. Pierce, Plant Chemical Engineer, Palisades
- ¹L. J. Kenaga, Plant Health Physicist, Palisades
- ¹R. P. Margol, QA Administrator, Palisades
- ²T. Grieves, QA Engineer, Palisades
- ¹E. A. Dziedzic, Training Supervisor, Palisades
- J. Hager, Laboratory Supervisor - Radiological, Palisades
- R. J. Clendenning, Rad Safety Supervisor, Palisades
- N. A. Campbell, Senior Radiation Safety Supervisor, Palisades
- M. L. Grogan, Radiation Material Control Supervisor, Palisades
- ¹B. Jorgensen, NRC Senior Resident Inspector

¹Attended the exit interview on October 5, 1984.

²Contacted the inspector by telephone on October 9, 1984.

2. Licensee Action on Previous Inspection Findings

- a. (Closed) Violation (50-255/82-22): Milk was collected monthly from February 1981 until May 1982 from three sites rather than from four sites as required in T/S 4.11.1. On February 28, 1983, the licensee wrote the NRC to correct the response to Inspection Report 82-22 stating that four milk samples were not collected monthly until October 1982. The inspectors reviewed the Annual Radiological Environmental Monitoring Reports and monthly reports for the latter half of 1982, CY 1983, and CY 1984 to date to confirm that milk has been sampled from four different dairies and farms each month since October 1982. No problems were noted.
- b. (Closed) Violation (50-255/82-22): No report submitted to the NRC regarding missing milk samples. As discussed above in Item 2a, the licensee has reported that all milk samples have been collected and properly documented in monthly and annual reports and on sample collection log sheets since October, 1982.
- c. (Closed) Open Item (50-255/82-22-01): To analyze a liquid sample for ³H, ⁸⁹Sr, ⁹⁰Sr, and gross beta activity and submit the results to Region III for comparison. Results for comparative analytical results for the above radionuclides were discussed in a letter from C. J. Paperiello to the licensee, dated June 10, 1983. The licensee

analyzed an additional spiked sample for ^{89}Sr and ^{90}Sr . The results of these analyses are presented in Table I with this report. The licensee had two possible agreements under the comparison criteria in effect at that time. Due to some question about the handling of this sample prior to analysis, an additional spiked sample was provided to the licensee. The results of these latest comparisons for ^{89}Sr and ^{90}Sr are presented in Table II. The acceptance criteria were relaxed for these radionuclides to allow for some additional sources of error introduced by the relatively complex chemical separation required in the analysis of these radionuclides. Comparisons for these two radionuclides are generally favorable. This item is therefore closed.

- d. (Closed) Open Item (50-255/82-22-02): To update and complete a new procedures manual. The licensee has undertaken a major revision to the format and content of procedures under a new Nuclear Operations Department Standards (NODS) System which went into effect late in 1982. Since then changes in procedures have, to some extent, addressed the concerns identified in the previous inspection. The inspectors reviewed selected procedures dealing with chemistry and counting room activities and instrumentation. New procedures appear to be of good quality and technically adequate. Responsibilities in these areas appear to be divided between health physics and chemistry personnel. Since the last inspection, responsibility for the counting room has been transferred from chemistry to health physics. Health physics procedures addressing counting room activities appear to be substantially complete; whereas many chemistry procedures still need to be written or modified. This item will be closed and our remaining concerns in this area will be tracked by Open Item 50-255/84-21-01. (Section 6).

3. Management Controls, Organization, Training and Qualifications

The inspectors reviewed the licensee's management controls for implementing the requirements of the radiological environmental monitoring program (REMP). The licensee has prepared several administrative procedures, including the Nuclear Operations Department Health Physics Standard (NODS-H05) "Radiological Environmental Monitoring", dated August 28, 1984; "Radiological Services Organization" (RSD) (RSD-A-01), dated February 10, 1984; and "Nuclear Plants Radiological Environmental Program" (RSD-A-20), dated August 10, 1984, which describe the responsibilities for conduct of the REMP. The Director of RSD, and his Section Head of Radwaste Shipping, REMP and Byproduct Material, are directly responsible for administering the REMP contract with the present contractor, Teledyne Isotopes, Inc. Eberline Instrument Corporation was the former contractor up to January, 1984. The contractor collects and analyzes all environmental media. This Section Head also coordinates the REMP with the Chemistry/Health Physics Superintendent at the Palisades plant regarding the daily conduct of the program. The Radiation Materials Control (RMC) Supervisor at the plant under this Superintendent provides the necessary supplies to the Teledyne Isotopes sample collector to assure the REMP is carried out each week. The RMC Supervisor also verifies that air sampling equipment is calibrated annually and is properly maintained. No problems were noted regarding management controls of the REMP.

The organization and staffing of the Chemistry/Health Physics Department (C/HPD) were also reviewed. Under the Superintendent of C/HPD, laboratory functions and responsibilities are separated from the counting room functions. The counting room activities are under the Plant Health Physicist and the chemistry/radiochemistry activities under the Plant Chemical Engineer. They appear to have adequate management support to effectively meet plant chemistry and counting requirements. The inspectors also found that the Health Physicist and Chemical Engineer each have a sufficient number of staff and technicians available to effectively perform their work.

Training for the radiation and chemistry technicians and their respective qualifications were reviewed. A formal technical training program consisting of courses in chemistry, health physics, instrumentation and related topics are presented at the Midland Nuclear Training Center. This program has been in operation for over two years and is described in Nuclear Operations Department Training Program 19.A for entry level chemistry/health physics technicians, approved on January 1, 1983. Available technicians are enrolled in consecutive courses. The licensee requires technicians to complete the series of courses to become eligible for consideration for promotion to a senior technician. The licensee has developed a chemistry technician qualification program (Proc. No. CH1.1, dated February 22, 1984) requiring the technicians to participate in a training program and to demonstrate proficiency in laboratory practices by having practical and written examinations. No problems were identified during review of the training program and the technician qualifications. A continuing training program (Program No. 14) is being presented for experienced CHP technicians to maintain knowledge of regulatory, procedural and facility changes specific to the Palisades plant.

No violations or deviations were identified.

4. Implementation of the Radiological Environmental Monitoring Program

The licensee's implementation of the REMP was reviewed to assure compliance with Technical Specifications Section 4.11 requirements. Sample collection log sheets and monthly and annual REMP reports for 1982, 1983 and 1984 to date were reviewed. All samples were collected and analyses were accounted for, including missing samples. No problems were noted in the analytical results. However, an anomaly was observed for slightly elevated gross beta results of the monthly well water samples taken from the Van Buren State Park wells. The inspectors took well water samples from the park and onsite wells. These samples will be analyzed by the NRC Reference Laboratory and the results will be reported in an addendum to this report. The licensee reported the depths of the wells and stated that the gradient of flow of the plant well was toward Lake Michigan. The one onsite well had a depth of 108 ft. and two had depths of about 30-40 ft. The State Park well is about 45 ft. deep. The licensee reported that the Park well has been historically higher in gross beta concentrations than either the Covert Township park (on the southern side of the Plant) or the onsite well locations. The elevated levels are below drinking water standards. The licensee agreed to investigate the source of the elevated gross beta levels. (Open Item 50-255/84-21-02).

The inspectors toured five air sampling stations and TLD stations, and two water compositors. The licensee agreed to place stickers or tags on each air sampler to indicate the date of calibration and the person conducting the calibrations. (Open Item 50-255/84-21-03)

Calibrations are performed annually. The inspectors reviewed the calibration cards maintained on each air sampler and noted no problems.

No problems were observed for the TLD station or water compositors. Quarterly TLD results for 1983 of NRC and the licensee for sites where TLD's were collocated revealed no problems.

The inspectors determined that the licensee had performed a land use census on June 8, 1983, that indicated no changes in land use. However, licensee representatives indicated that dairy farms near the plant are slowly going out of business and it is getting more difficult to obtain milk samples.

The inspectors also reviewed several environmental procedures developed by the Radiological Services Department, including "Land Use Census" (RSD-E-01) dated November 1, 1982; "Radiological Environmental Monitoring Program Surveillance" (RSD-E-02) dated July 18, 1984; "Preparation of Radiological Annual Environmental Report for Palisades Plant" (RSD-E-03) dated March 15, 1984; and "Palisades Radiological Environmental Program Sample Collection and Shipment" (RSD-E-11) dated August 20, 1984, and noted no problems. In addition, no problems were identified in the contractor's internal QC program, or in the results of his participation in the EPA's cross check program for interlaboratory comparisons.

No violations or deviations were identified.

5. Measurements and Observations

While touring the licensee's laboratories, the inspector made face velocity measurements of two fume hoods in the hot lab. The air flow in both hoods was acceptable.

Analytical instruments, in general, were found to be operable and currently calibrated. Chemical solutions were labeled with preparation and expiration dates listed. Housekeeping could be improved, especially in the hot lab. The housekeeping problem is aggravated by lack of adequate working and storage space in some areas.

No violations or deviations were identified.

6. Quality Control of Analytical Measurements

During a tour of the licensee's laboratories the inspectors examined daily quality control logs of several counting instruments. Instances when detector performance was outside of limits were flagged and supervisory review and corrective action, if any, appeared appropriate.

The inspectors examined selected results of blind sample analyses required of chemistry technicians every three months. The results appeared satisfactory. All technicians are required to participate in these blind analyses which involve chemical parameters important to the plant and/or important instruments or techniques. These analyses along with other tasks are scheduled and tracked with the PAC System (Periodic Activity Control).

A finding in Audit A-QT-84-11 addresses the lack of chemistry QC procedures as required by the Chemistry Program Manual. The licensee does in fact perform actions that can be considered part of a QC program but these have not been formalized in procedures as required by the Chemistry Program Manual.

The licensee has undertaken a major revision of procedures to conform to requirements imposed by Nuclear Operations Department Standards (NODS) issued at the corporate level. The NODS mandate a Chemistry Program Manual which was first issued in October 1982. The manual defines goals and requirements for Chemistry Operating procedures and programs. Only a fraction of these procedures have been prepared or revised to conform to the new requirements. Licensee representatives stated that loss of key staff members and unexpected outages over the last two years had been contributing factors in not finishing the procedure revisions. At the exit interview, the licensee agreed to have the procedures required by the Chemistry Program Manual completed by July 1, 1985. (Open Item 50-255/84-21-01)

No violations or deviations were identified.

7. Sample Analyses

Five inplant samples (gas decay tank, charcoal and particulate filters, reactor coolant, and liquid waste) were collected and analyzed onsite with the Region III Mobile Laboratory for gamma isotopic activity. Comparative results are presented in Table II. Comparison criteria are outlined in Attachment 1. In addition, a sample from a clean waste receiver tank was collected and will be analyzed for ^3H , ^{89}Sr , ^{90}Sr and gross beta by the licensee and by the NRC Reference Laboratory. Licensee representatives agreed to submit these additional results to Region III for comparison, to be reported in an addendum to this report (Open Item 50-255/84-21-04). Table II also presents comparison for ^{89}Sr and ^{90}Sr on a spiked liquid sample analyzed by the licensee and discussed in Section 2c.

Of thirty-six comparisons presented in Table II, thirty-three are classified as agreements. Two of the disagreements are not especially significant. The licensee did not identify the 622keV gamma as coming from the decay of Ru-106 but rather as coming from the daughter Rh-106. Due to the short half-life of Rh-106 (30 seconds) the presence of the 622keV gamma ray indicates the presence of the long lived parent Ru-106. The licensee has modified his nuclide library to take this into account. The disagreement for Cs-137 was most likely caused by poor counting statistics. This is supported by indications of a poor peak shape evident in the licensee's analysis printout. This is probably not symptomatic of any significant problem. The disagreement for Xe-133 was caused by the licensee's using an efficiency obtained by freehand drawing of the efficiency curve in this energy region rather than using a calibration point that was available. The effect was to make the licensee's results conservatively high for Xe-133.

The reason for taking this action was the fact that the efficiency curves generated by the licensee looked atypical in this energy region if the actual calibration point was used to generate the efficiency curve. The licensee consulted with the manufacturer of the detector and decided to draw a curve that resembled more typical curves for this type detector rather than use the point that was considered suspect. Comparisons made during this inspection and analysis of other efficiency curves for the licensee's detector suggest that the detector's efficiency response is slightly atypical and in fact there is nothing wrong with the measured calibration point. The licensee has agreed to use the measured calibration point in the future. (Open Item 50-255/84-21-05)

No violations or deviations were identified.

8. Licensee Internal Audits

The inspector examined licensee review and audit activities in the area of environmental monitoring and chemistry and radiochemistry to assure compliance with T/S 6.5. A surveillance report (S-QP-83-06) dated January 10-11, 1983, of the environmental monitoring program revealed the same milk sampling problems identified in the previous NRC inspection report.^{1]} This surveillance was closed out in February 1983. An audit report (A-QT-83-29) dated December 12-15, 1983, indicated that the corporate and plant REMP activities were adequately implemented. The QA Department performed an audit (A-SE-83-32) of the licensee's former REMP contractor (Eberline Instrument Corporation) on October 3-7, 1983 and identified two findings. One dealt with a lack of implementation of the Eberline QA program, and the second with a violation of the requirements of 10 CFR 21 concerning posting and implementing. The findings were addressed adequately by the contractor in a letter dated November 21, 1983.

In the area of chemistry/radiochemistry, several audits (A-QA-84-2 on January 23 - February 3, 1984 and A-QT-84-11 on June 4 - August, 1984) were performed by the licensee's QA Department. The major findings concerned lack of chemistry and laboratory QC procedures, matters which were identified in a previous inspection report.^{2]} This matter is discussed further in Section 6 of this report.

No violations or deviations were identified.

9. Exit Interview

The inspectors met with licensee representatives, denoted in Section 1, at the conclusion of the inspection on October 5, 1984. The scope and findings of the inspection were discussed. In response to inspectors' comments licensee representatives agreed to the following actions:

- a. Complete procedures required by the Chemistry Program Manual by July 1, 1985 (Open Item 50-255/84-21-01) (Section 6);
- b. Analyze liquid sample for ^3H , ^{89}Sr , ^{90}Sr and gross beta and report results to Region III (Open Item 50-255/84-21-04) (Section 7);

^{1]}Inspection Report No. 50-255/82-22

^{2]}Ibid

- c. Use calibrated rather than inferred efficiencies for Xe-133 (Open Item 50-255/84-21-05) (Section 7);
- d. Investigate the elevated gross beta activity in the Van Buren State Park well water (Open Item 50-255/84-21-02) (Section 4);
- e. Tag air samplers with calibration dates (Open Item 50-255/84-21-03) (Section 4).

Attachments:

- 1. Table I, Confirmatory Measurements
Program Results, 4th Quarter 1982
- 2. Table II, Confirmatory Measurements
Program Results, 4th Quarter 1984
- 3. Criteria for Comparing Analytical
Measurements

TABLE I

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

SAMPLE	ISOTOPE	-----NRC-----		----LICENSEE----		---LICENSEE:NRC---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
L SPIKED	SR-89	3.9E-04	8.0E-06	2.6E-04	4.0E-06	6.8E-01	4.8E 01	P
	SR-90	6.1E-05	1.8E-06	3.5E-05	3.0E-07	5.7E-01	3.4E 01	P

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: PALISADES
 FOR THE 4 QUARTER OF 1984

SAMPLE	ISOTOPE	-----NRC-----		----LICENSEE----		---LICENSEE:NRC---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
L SPIKED	SR-89	1.8E-04	3.0E-06	1.3E-04	2.0E-05	7.6E-01	5.9E 01	A*
	SR-90	2.9E-05	9.0E-07	2.1E-05	3.0E-06	7.1E-01	3.2E 01	A*
P FILTER	CR-51	5.4E-09	1.9E-10	7.1E-09	4.7E-10	1.3E 00	2.9E 01	A
	MN-54	3.2E-10	2.6E-11	2.3E-10	7.6E-11	7.2E-01	1.2E 01	A
	CO-58	1.7E-09	5.0E-11	1.9E-09	1.1E-10	1.1E 00	3.4E 01	A
	CO-60	3.4E-09	7.7E-11	4.0E-09	1.7E-10	1.2E 00	4.4E 01	A
	ZR-95	4.2E-10	4.2E-11	6.9E-10	8.7E-11	1.6E 00	1.0E 01	A
	NB-95	3.3E-10	2.6E-11	4.6E-10	5.3E-11	1.4E 00	1.2E 01	A
PRIMARY	CR-51	3.5E-03	7.4E-05	4.3E-03	8.6E-05	1.2E 00	4.8E 01	A
	MN-54	1.9E-03	2.0E-05	2.2E-03	2.1E-05	1.1E 00	9.6E 01	A
	CO-57	2.9E-05	3.1E-06	3.4E-05	3.7E-05	1.2E 00	9.4E 00	A
	CO-58	5.9E-03	3.1E-05	6.8E-03	3.2E-05	1.1E 00	1.9E 02	A
	CO-60	5.2E-03	3.5E-05	5.5E-03	3.4E-05	1.1E 00	1.5E 02	A
	I-131	3.5E-05	6.8E-06	3.5E-05	7.5E-06	9.9E-01	5.2E 00	A
	BA-140	7.9E-04	6.9E-05	1.0E-03	4.4E-05	1.3E 00	1.2E 01	A
	TC-99M	3.0E-05	3.1E-06	3.9E-05	4.0E-06	1.3E 00	9.8E 00	A
C FILTER	I-131	6.1E-09	6.1E-10	7.9E-09	7.0E-10	1.3E 00	9.9E 00	A
L WASTE	CR-51	8.1E-05	4.0E-06	8.0E-05	3.7E-06	9.8E-01	2.0E 01	A
	MN-54	2.4E-05	8.3E-07	2.4E-05	6.8E-07	1.0E 00	2.8E 01	A
	FE-59	2.3E-05	1.7E-06	2.5E-05	1.4E-06	1.1E 00	1.3E 01	A
	CO-57	1.1E-06	2.5E-07	8.9E-07	2.2E-07	8.1E-01	4.5E 00	A
	CO-58	4.8E-05	1.1E-06	5.5E-05	9.8E-07	1.1E 00	4.3E 01	A
	CO-60	2.4E-04	2.2E-06	2.4E-04	1.7E-06	9.9E-01	1.1E 02	A
	I-131	2.2E-06	4.8E-07	2.0E-06	3.8E-07	9.2E-01	4.6E 00	A
	AG-110M	5.7E-06	4.5E-07	4.6E-06	3.8E-07	8.1E-01	1.3E 01	A
	SR-92	6.4E-06	1.1E-06	3.6E-06	6.4E-07	5.6E-01	5.6E 00	A
	NB-95	5.5E-06	6.3E-07	5.2E-06	5.3E-07	9.5E-01	8.7E 00	A
	NB-97	6.8E-06	5.3E-07	5.3E-06	4.4E-07	7.7E-01	1.3E 01	A

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

TABLE II

U S NUCLEAR REGULATORY COMMISSION
 OFFICE OF INSPECTION AND ENFORCEMENT
 CONFIRMATORY MEASUREMENTS PROGRAM
 FACILITY: PALISADES
 FOR THE 4 QUARTER OF 1984

SAMPLE	ISOTOPE	-----NRC-----		----LICENSEE----		---LICENSEE:NRC---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
L WASTE	RU-106	2.3E-05	5.0E-06	0.0E-01	0.0E-01	0.0E-01	4.7E 00	D
	SB-125	1.2E-05	1.5E-06	1.1E-05	1.2E-06	9.4E-01	7.7E 00	A
	LA-140	9.9E-06	5.7E-07	1.0E-05	4.4E-07	1.1E 00	1.8E 01	A
	CE-144	7.8E-06	1.8E-06	6.8E-06	1.7E-06	8.7E-01	4.4E 00	A
	CS-137	4.9E-06	4.9E-07	2.3E-06	3.4E-07	4.8E-01	9.9E 00	D
GAS	XE-133	5.2E-03	1.5E-05	7.7E-03	2.8E-05	1.5E 00	3.4E 02	D
	XE-131M	4.7E-05	9.9E-06	5.1E-05	1.4E-05	1.1E 00	4.7E 00	A
	XE-133M	1.5E-05	2.2E-06	1.3E-05	5.5E-06	8.8E-01	6.8E 00	A

T TEST 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 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.

RESOLUTION

RATIO = LICENSEE VALUE/NRC REFERENCE VALUE

Agreement

<3		No Comparison
<u>≥</u> 3 and <4		0.4 - 2.5
<u>≥</u> 4 and <8		0.5 - 2.0
<u>≥</u> 8 and <16		0.6 - 1.67
<u>≥</u> 16 and <51		0.75 - 1.33
<u>≥</u> 51 and <200		0.80 - 1.25
<u>≥</u> 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.