

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-409/82-17(DEPOS)

Docket No. 50-409

License No. DPR-45

Licensee: Dairyland Power Cooperative
P.O. Box 817, 2615 East Avenue South
LaCrosse, WI 54601

Facility Name: LaCrosse Boiling Water Reactor (LACBWR)

Inspection At: LACBWR Site

Inspection Conducted: October 4-15, 1982

Inspectors: *M. Schumacher for*
N. A. Nicholson

10/28/82

M. Schumacher for
J. L. Lynch

10/28/82

M. Schumacher
M. C. Schumacher

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

10/28/82

Inspection Summary:

Inspection on October 4-15, 1982 (Report No. 50-409/82-17(DEPOS))

Areas Inspected: (Routine, Announced) inspection of radiological environmental protection including program management, quality control, and implementation, confirmatory measurements including sampling, laboratory quality control, and comparison of licensee analyses with the Region III mobile laboratory and the NRC reference laboratory; and followup items identified in previous inspections. The inspection involved 120 inspector-hours on site by three NRC inspectors.

Results: No items of noncompliance or deviations were identified in six of the seven areas examined; one apparent item of noncompliance was identified in one area violation - failure to perform monthly strontium analysis of liquid waste water composite - Severity V - Section 4.b.

DETAILS

1. Persons Contacted

- ²J. Parkyn, Plant Superintendent
- ¹L. W. Kelley, Acting Plant Superintendent
- ¹L. S. Goodman, Operations Engineer
- ¹R. Wery, Quality Assurance Supervisor
- P. Shafer, Radiation Protection Engineer
- ^{1,2}B. Zibung, Health & Safety Supervisor
- ^{1,2}L. Nelson, Radiation Protection Engineering Specialist
- T. Steele, Environmental Department Manager
- ³J. Taylor, Asst. General Manager for Power

¹Attended exit meeting October 8, 1982.

²Telephone discussion October 15, 1982.

³Telephone discussion October 15, 1982.

2. Licensee Action on Previous Inspection Findings

- a. (Closed) Open Item (409/77-19-02): Establish QA Program and conduct audits to ensure implementation of environmental program. The licensee's QA program was extended in 1978 to include environmental monitoring. QA audits were conducted in mid 1978 (Audit 78-06) and in 1980 (Audit 70-80-1). Another is scheduled for November 1982.
- b. (Closed) Open Item (409/77-19-03): Licensee to hire qualified management individual to review environmental data. Responsibility for initial onsite review has been assigned to the Radiation Protection Engineer and the Health and Safety Supervisor. Qualified individuals have been assigned to both of these positions within the past two years.
- c. (Closed) Open Item (409/77-19-04): Environmental Program to include procedures and limits for corrective action and followup on abnormal results. Licensee procedure HSP 03.4, "LACBWR Environmental Monitoring Program - Sample Preparation and Analysis" requires management review of unusual results with resampling if results are ten times normal.
- d. (Closed) Open Item (409/77-19-07): 1976 Annual Report to be corrected for missing data, and increased rainwater radioactivity to be reviewed for cause and review results to be submitted with the subsequent semi-annual report. The inspector confirmed that the appropriate changes had been made.
- e. (Open) Open Item (409/81-17-01): Review ⁹⁰Sr in liquid analysis to resolve problem of underquantification; use interim correction factor until problem is resolved. The most recent comparisons (September 1981) indicate that licensee results still differ

significantly from the NRC reference laboratory. Analysis of a spiked sample sent to the licensee in December 1981 by the NRC reference laboratory was just begun during this inspection. A new strontium analysis method adopted in mid 1982 remains unvalidated. Licensee failure to follow procedures requiring monthly analysis of ^{90}Sr in liquid wastes was cited as noncompliance during the current inspection. This matter remains open until these problems are resolved. (Sections 4b and 4d).

- f. (Closed) Open Item (409/81-17-02): Recalibration of all gamma spectrometer, system geometries, particularly gas and charcoal, and determine a suitable charcoal adsorber counting procedure. The inspectors confirmed that the licensee recalibrated each of its three gamma spectrometer systems in 18 different geometries using standards prepared from certified source material. Different charcoal adsorber counting regimes were investigated. The current comparisons indicate that charcoal adsorber disagreements have been resolved. The licensee's calibration techniques appeared satisfactory.
- g. (Open) Open Item (409/81-17-03): Licensee to report results of spiked samples submitted to test new calibrations; report results of liquid split for gross beta, tritium, and strontium to Region III. The split sample results were reported to Region III in September 1981 and are discussed in Section 4 of this report. As noted in Section 4b, the spiked sample results have not yet been submitted. This item remains open until a satisfactory ^{90}Sr comparison is achieved.
- h. (Closed) Open Item (409/81-17-04): Licensee to ensure use of air flow correction factors through appropriate training and procedure revision. The inspector noted that this correction is addressed in licensee procedures and that licensee personnel use the correction factor in calculating total sample volume.

3. Radiological Environmental Monitoring Program (REMP)

a. Management Controls

The program, defined in licensee procedures HSP 03.1 through HSP 03.4 is the joint responsibility of the onsite Health and Safety Department and the corporate Environmental Department. It is managed onsite by the Radiation Protection Engineer and the Health and Safety Supervisor. Station personnel collect the samples and analyze them onsite except for milk which is sent to the University of Wisconsin, LaCrosse (UWL) for analyses for ^{131}I and ^{90}Sr . The Environmental Department is responsible for final data review and publishes the semiannual report. The problems observed with this program indicated management oversight weakness.

b. Quality Control

There is no routine program of quality control such as the use of spike samples or split sample comparison to ensure validity of results. Data are not plotted to enhance following of trends. Review of past reports indicate anomalous data are sometimes reported without explanation: for example, the air particulate activity peak observed in early 1981 that apparently resulted from atmospheric bomb testing. In 1982 the Environmental Department began receiving EPA cross check samples of iodine in water for comparative analysis by their contractor laboratory at the University of Wisconsin, LaCrosse. This practice should be extended to the licensee's onsite laboratory and broadened to include other isotopes in other media.

Formal quality assurance audits were begun in 1978 in response to an earlier NRC inspection.¹ They are performed at approximately two year intervals and appear reasonably thorough in examining licensee adherence to his program. The next audit is scheduled for November 1982. However, they are not a substitute for day to day management review of the REMP.

c. Implementation

Inspector review of licensee records, including semiannual reports (January 1981 through June 1982), laboratory analyses, and collection logs revealed errors in recorded and reported data, inconsistencies in sample location designations, and failure to adhere to the defined program that reflect weakness of management review.

- . Sediment data for two December 30, 1981, samples in the 1981 report had been incorrectly converted (to pCi/g) from data originally recorded (in μ Ci/g) in the Environmental Results Log kept in the laboratory. Inconsistency in the error factor suggests weakness in training as well as supervisory review. Similar conversion errors were found in 1982 sediment analysis data kept in a log titled, "Semiannual Effluent Report Data."
- . Number designations for two air particulate sample stations (LACBWR plant and Lock and Ram #8) in Table VII of the semi-annual report are inconsistent with designations in Figure 2 of the same report.
- . Monthly river water samples were reported in 1981 for three locations instead of the four specified in procedure HSP 03.3, "LACBWR Environmental Monitoring Program - Sample Collection". No samples were reported for the plant outfall. Sediment samples (required twice yearly at three specified locations)

¹RIII Inspection Report No. 409/77-19.

were missed twice at the crib house (designated downstream point) and once at the plant outfall. Samples from alternate upstream locations were taken.

An inspector accompanied a licensee technician on the weekly sample collection at four environmental air monitoring stations. All air samplers were operating and run time meters indicated continuous operation since the previous sample change. Other collection devices and licensee TLD badges were in place as specified in applicable licensee procedures. The technician was obviously well acquainted with the equipment and with the program requirements. The log book used for the air sampling stations was well kept and the appropriate air flow correction factors were being used to calculate sample volume.

By contrast, a separate log book using for recording other sample collections (water, milk, vegetation, etc.) was indifferently kept. A spot check to confirm sample dates given in the semiannual report revealed that river water samplings in September and October 1981 and February 1982 were unrecorded. Licensee representatives stated that this log book is not taken into the field as is the air sample station log, but is normally filled out at the end of the day.

During the collection tour, the inspector observed that NRC TLD badges were in place at licensee stations 15 and 17; the NRC badge at station 6 (Trailer Court) was missing. Fourth quarter readings for licensee and NRC badges at the same locations were similar.

4. Analytical Measurement

a. Quality Control

Health physics technicians perform radiological and nonradiological measurements at the plant. Management's assurance of measurement quality appears limited to supervisory review and periodic calibrations. Controls such as spiked samples, split samples, or replicate analyses are generally not used. The inspectors were told that significant quality controls are applied to nonradiological measurements at the licensee's coal fired plants. An analogous effort should be made at LACBWR.

Quality assurance type audits affecting the analytical laboratory were done in August 1981 and September 1982. Response to two findings (expired reagent on the shelf and overdue procedures review) was slow; they were still not closed at the time of the 1982 audit. Both were subsequently closed after a specific request by the plant manager. The inspectors observed no out-of-date reagents in their tours of the laboratory.

The inspectors reviewed records of the most recent (November 1981) calibrations of the licensee's three gamma spectrometer systems.

Eighteen different geometries, encompassing all routinely sampled media were calibrated on each of the systems. Fresh NBS traceable source material was used to make up standards in the various configurations. The work was well documented and apparently well done.

b. Analysis of Strontium in Liquids

Previous inspections ^{2,3,4} indicated the licensee's quantification of strontium 90 in liquids was consistently nonconservative. He agreed during the last confirmatory measurements inspection to use an arbitrary factor of three multiplier until the quantification discrepancy had been resolved. In the most recent split sample comparison the licensee was again in disagreement with the NRC reference laboratory (RESL) - but now one to two orders of magnitudes conservative. A spiked strontium in liquid sample was sent to the licensee December 1981 by RESL. The licensee's analysis was still not done at the time of this inspection and the matter is still not resolved. At the exit interview, the licensee stated that the analysis would be completed by October 22, 1982. This date was postponed until October 25 at the request of licensee (telephone discussion of October 14, 1982).

Licensee records indicated that monthly liquid waste composites required by licensee procedure HSP 7.6 were analysed as usual for the remainder of 1981 and that the agreed upon correction factor had been applied. However, the monthly liquid composites for 1982 were not analysed for approximately six months between January and July 1982. This appears to be noncompliance with licensee procedure 07.6, "Schedule of Water Samples and Analysis", and thereby with Technical Specification 6.8.1.a which requires adherence to procedures governing sampling and analysis of discharges of liquid radwaste.

Beginning about July 1982 the licensee resumed analysis for strontium in water using a method obtained from the UWL laboratory that performs the licensee's milk analysis. There appears to have been no validation of the method as used at the licensee's laboratory nor any comparison made between the licensee's old and new procedures.

c. Sample Comparisons of October 1982

Effluent samples of four media - gas, liquid, air particulate, and charcoal cartridge - were collected on October 7, 1982, and analyzed by the licensee and the Region III Mobile Laboratory.

²RIII Inspection Report No. 409/79-21

³RIII Inspection Report No. 409/80-08

⁴RIII Inspection Report No. 409/81-17

Results of comparative analyses are in Table 1; comparison criteria are defined in Attachment 1. Nineteen of twenty comparisons met criteria for agreement or possible agreement. In general, licensee values were higher than NRC values for the charcoal cartridge, air particulate filter, and gas sample.

Both the charcoal cartridge and the air particulate filter were pulled from the main stack SPING-3 and analyzed onsite. The two iodine species on the charcoal were in agreement. ^{137}Cs on the air particulate filter was in disagreement, with the licensee's value greater than that of the NRC (ratio of 4.2). The disagreement was discussed with onsite representatives; calibration data and analytical techniques were reviewed. No apparent cause of the discrepancy was identified. A second particulate filter from the main stack SPING H was collected and will be analyzed by RESL. Comparative results will be presented in an addendum to this report.

A liquid sample collected from the 3,000 gallon waste tank was analyzed in Region III the week following the onsite inspection. All comparisons were categorized as agreements. The licensee will submit beta analyses results of this sample for ^3H , ^{89}Sr , ^{90}Sr , and gross beta (to be counted November 5, 1982, 11:00 AM CST) to Region III by December 15, 1982; these results will be compared with those of RESL and presented in an addendum to this report.

d. Beta Analyses of the 1981 Liquid Split Sample

Comparative results of beta analysis of the liquid waste tank sample taken August 26, 1981 are shown in Table II. The tritium disagreement (licensee conservative) will be reviewed further after the liquid sample collected October 7, 1982, is analysed.

As discussed in Sections 2.e and 4.b., the strontium analysis disagreement has not been satisfactorily resolved. We will examine the licensee's analyses of the RESL spiked sample and of the split sample of October 7. These results will be compared in an addendum to this report.

5. Management Interviews

The inspection findings were discussed with licensee representatives (Section 1) at the close of the inspection on October 8, 1982, and by telephone on October 15, 1982.

- a. Failure to perform monthly ^{90}Sr analysis of liquid waste composites required by procedure HSP 07.6 appears to be noncompliance with Technical Specification 6.8.1.a. (Noncompliance 409/82-17-01) (Section 4b)
- b. The licensee will complete strontium analysis of the RESL spiked sample and telephone the results to Region III by October 25, 1982. (Sections 2g and 4b) (Open item 409/81-17-03)

- c. The licensee will analyse the liquid split sample of October 7, 1982, for tritium, ^{89}Sr , ^{90}Sr , and gross beta (to be counted November 5, 1982 at 11:00 CST) and report the results to Region III by December 15, 1982. (Section 4c) (Open Item 405/82-17-02)
- d. The particulate filter collected during this inspection will be analysed by RESL; the results, together with the results of the liquid split sample comparison will be transmitted in an addendum to this report. (Section 4c) (Open Item 409/82-17-03)
- e. The inspectors noted the need for better assurance of quality in the environmental monitoring and analytical measurements programs. Improved supervisory review of program implementation and data, use of quality control samples and analyses, and data trending were discussed. The licensee stated that a program for improvement in these areas would be developed and implemented over the next few months. The inspectors stated that specific improvement details would be requested in response to this report. (Sections 3 and 4) (Open Item 409/82-17-04)
- f. Errors noted in the 1981 semiannual report will be corrected. (Section 3c) (Open Item 409/82-17-05)

Attachments:

1. Criteria for Comparing Analytical Measurements
2. Table 1, Confirmatory Measurements Program Results, 4th Qtr. 1982.
3. Table 2, Confirmatory Measurements Program Results, 3rd Qtr. 1981.

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.

TABLE: 1

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

SAMPLE	ISOTOPE	-----NRC-----		---LICENSEE---		---LICENSEE:NRC---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
OFF GAS	KR-85M	3.4E-03	1.2E-05	3.8E-03	1.7E-05	1.1E 00	2.8E 02	A
	KR-87	3.2E-03	2.4E-05	3.7E-03	2.7E-05	1.2E 00	1.3E 02	A
	XE-133	4.9E-03	2.0E-05	7.3E-03	4.0E-05	1.5E 00	2.5E 02	P
	XE-133M	4.1E-04	5.6E-05	3.9E-04	6.8E-05	9.5E-01	7.3E 00	A
	XE-135	3.6E-02	3.8E-05	4.8E-02	5.1E-05	1.3E 00	9.5E 02	P
	XE-135M	2.7E-04	1.7E-05	3.4E-04	1.7E-05	1.3E 00	1.6E 01	A
L WASTE	MN-54	1.3E-05	3.3E-07	1.2E-05	2.2E-07	9.0E-01	4.0E 01	A
	CD-60	8.5E-05	7.5E-07	7.6E-05	5.1E-07	8.9E-01	1.1E 02	A
	CD-58	3.1E-06	2.2E-07	3.1E-06	1.7E-07	1.0E 00	1.4E 01	A
	CS-137	2.2E-04	9.9E-07	2.2E-04	7.1E-07	1.0E 00	2.2E 02	A
	ZN-65	2.3E-06	4.7E-07	3.1E-06	3.8E-07	1.3E 00	4.9E 00	A
	NB-95	9.4E-07	2.0E-07	9.4E-07	1.4E-07	1.0E 00	4.7E 00	A
	CS-134	1.9E-05	3.4E-07	2.0E-05	2.6E-07	1.0E 00	5.7E 01	A
	CE-144	2.8E-06	8.1E-07	1.8E-06	5.5E-07	6.5E-01	3.5E 00	A
P FILTER	MN-54	3.1E-05	4.0E-06	5.1E-05	6.1E-06	1.6E 00	7.7E 00	A
	CD-60	1.8E-04	7.6E-06	2.8E-04	1.2E-05	1.6E 00	2.3E 01	A
	CS-137	2.3E-05	3.4E-06	9.7E-05	6.1E-06	4.2E 00	6.8E 00	D
	I-133	1.6E-05	2.2E-06	2.4E-05	7.6E-06	1.5E 00	7.3E 00	H
C FILTER	I-131	2.3E-04	1.1E-05	2.8E-04	9.2E-06	1.2E 00	2.1E 01	A
	I-133	4.7E-04	2.3E-05	5.6E-04	2.8E-05	1.2E 00	2.0E 01	A

T TEST RESULTS:

A=AGREEMENT

D=DISAGREEMENT

A=POSSIBLE AGREEMENT

N=NO COMPARISON

TABLE II

U S NUCLEAR REGULATORY COMMISSION
 OFFICE OF INSPECTION AND ENFORCEMENT
 CONFIRMATORY MEASUREMENTS PROGRAM
 FACILITY: LACBWR
 FOR THE 3 QUARTER OF 1981

SAMPLE	ISOTOPE	-----NRC-----		---LICENSEE---		---LICENSEE:NRC---		
		RESULT	ERROR	RESULT	ERROR	RATIO	RES	T
L WASTE	H-3	9.5E-03	5.0E-05	1.3E-02	0.0E-01	1.4E 00	1.9E 02	D
	BETA	2.9E-05	1.0E-06	2.6E-05	0.0E-01	9.1E-01	2.9E 01	A
	SR-89	6.0E-08	7.0E-08	1.3E-05	2.8E-06	1.6E 02	1.1E 00	N
	SR-90	4.7E-07	2.0E-09	7.3E-06	1.1E-06	1.6E 01	2.4E 02	D

T TEST RESULTS:
 A=AGREEMENT
 D=DISAGREEMENT
 P=POSSIBLE AGREEMENT
 N=NO COMPARISON