

U.S NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-409/86003(DRSS)

Docket No. 50-409

License No. DPR-45

Licensee: Dairyland Power Cooperative
2615 East Avenue - South
LaCrosse, WI 54601

Facility Name: LaCrosse Boiling Water Reactor

Inspection At: LaCrosse BWR Site, Genoa, WI

Inspection Conducted: March 10-14, 1986

D. E. Miller
Inspector: D. E. Miller

3-27-86
Date

L. R. Greger
Approved By: L. R. Greger, Chief
Facilities Radiation Protection
Section

3-28-86
Date

Inspection Summary

Inspection on March 10-14, 1986 (Report No. 50-409/86003(DRSS))

Areas Inspected: Routine, unannounced inspection of the radiation protection program during refueling and maintenance outage, including: organization and management controls; ALARA program; internal and external exposure controls; and control of radioactive materials and contamination. Also reviewed were previous inspection findings, the interim radwaste storage facility, IE Information Notices No. 85-81 and 35-92, and an incident involving hydrogen ignition in an offgas sampling rig. The inspection involved 35 inspector-hours onsite by one NRC inspector.

Results: One violation was identified (failure to follow a procedure requiring establishment of beta exposure rates - Section 6).

DETAILS

1. Persons Contacted

- *G. Boyd, Operations Supervisor
- *L. Goodman, Operations Engineer
- *L. Nelson, Health and Safety Supervisor
- J. Parkyn, Plant Superintendent
- *P. Shafer, Radiation Safety Engineer
- *R. Wery, Quality Assurance Supervisor

- *I. Villalva, NRC Senior Resident Inspector

The inspector also contacted other licensee employees.

*Denotes those present at the exit meeting.

2. General

The inspection which began at 11:30 a.m. on March 10, 1986, was conducted to examine the licensee's radiation protection activities during refueling and maintenance outage operations. The inspection included organization and management controls, ALARA program, internal and external exposure controls, and radioactive materials controls. Also reviewed were previous inspection findings, the interim radwaste storage facility, selected IE Information Notices, and an incident involving hydrogen ignition in an offgas sampling rig. A review of posting and labeling was made during several plant tours. No posting and labeling problems were noted. The general cleanliness of the plant was good.

3. Licensee Action on Previous Inspection Findings

(Open) Open Items (409/84-08-08 and 409/85005-02): Request for deviation from monitor readout requirements, design basis shielding requirements, and station requirements for use of SA-9 monitor. An updated request, dated November 8, 1985, was submitted to NRR concerning the noted subjects; the monitor readout requirement was inadvertently omitted from the updated request. No response from NRR concerning the updated request has been received by the licensee. The licensee will submit to NRR a supplemental request concerning the monitor readout requirements by April 1, 1986.

(Closed) Open Item (409/85015-03): Investigate film badge spiking technique and related readout/irradiated dose errors. The licensee identified technique errors that caused most of the errors. The licensee plans to alter the irradiation fixture to reduce possible unwanted scattered radiation. Results of December 1985 and January 1986 vendor readouts of spiked film badges displayed acceptable readout/irradiated dose errors.

4. Organization and Management Controls

The inspector reviewed the licensee's organization and management controls for radiation protection, including changes in the organizational structure and staffing, effectiveness of procedures and other management techniques used to implement the program, experience concerning self-identification and correction of program implementation weaknesses, and effectiveness of program audits.

The licensee's organization and management controls remain as described in Inspection Report No. 50-409/85015.

The licensee does not use health physics contractors to supplement the radiation protection staff. The only addition during this outage is temporary employment of an individual to handle and launder protective clothing and equipment during the day shift, five or six days a week; health physics technicians handle and launder protective clothing and equipment at other times.

In general, the radiation protection staff appears to adequately support the radiation protection, ALARA, chemistry, environmental, parts of the industrial hygiene and emergency planning, waste packaging, and the laundering of protective clothing and equipment programs during normal plant operations. The staff, however, appears strained during this refueling and maintenance outage. When asked, licensee representatives acknowledged that provision of radiation protection overview of ongoing work in radiologically significant areas is sometimes less than desired because of time spent on necessary routine labor intensive work such as handling and laundering protective clothing and equipment, and handling and packaging of radwaste. This matter was discussed at the exit meeting and will be reviewed further during future inspections. (409/86003-01)

No violations or deviations were identified.

5. ALARA

The inspector reviewed the licensee's program for maintaining occupational exposures ALARA, including: changes in ALARA policy and procedures; worker awareness and involvement in the ALARA program; establishment of goals and objectives; and effectiveness in meeting them. Also reviewed were management techniques used to implement the program and experience concerning self-identification and correction of program implementation weaknesses.

The ALARA program establishes goals which are used for ALARA management. Goals for 1985 included: reduction of station radiation dose; continued emphasis on worker participation to implement ALARA; continued effort in strengthening the contamination control program; improving installation of easily removable pipe insulation (metal); reduction of operator tours and neutron surveys; and increased change out frequency for the FESW filters.

During this refueling outage, health physics personnel were involved in pre-outage reviews and were aware of the major radiation exposure producing jobs in advance of the outage. The inspector observed that radiation protection management appeared to have good overall control of outage activities. The Health and Safety Supervisor has become more involved in planning and assessment of high exposure work as outlined in LACBWR Operating Manual, Volume X. Also, the radiation protection staff attempts to identify problems which may involve ALARA during their daily activities.

Total dose in 1985 was about 160 person-rems, which is about 80 person-rems less than 1984; this is a continued overall downward trend. The ALARA program has apparently been effective, and a more positive attitude by the plant staff to achieve ALARA is evident.

No violations or deviations were noted.

6. External Exposure Control and Assessment

The inspector reviewed the licensee's external exposure control and personnel dosimetry programs, including: changes in facilities, equipment, personnel, and procedures; adequacy of the dosimetry program to meet routine needs; and required records, reports, and notifications.

There have been no significant changes in the licensee's external exposure control and assessment program since the previous inspection 50-409/85015. The inspector selectively reviewed exposure records for the fourth calendar quarter 1985 and 1986 to date, including film badge and computer printout dose summaries.

The occupational external dose for the station in 1985 was about 160 person-rems; the ALARA goal was 225 person-rems. The highest personal exposure in 1985 was 3250 millirems. The licensee's ALARA goal for 1986 is 190 person-rems.

During observation of work being done in the reactor head cavity area in preparation for refueling, the inspector noted that workers were wearing protective clothing with surgeons caps (instead of hoods) and full face respirators; the workers' necks were not covered. During later review of surveys performed in the cavity, the inspector noted that removable contamination levels on cavity walls were up to about seven million disintegrations per minute per square foot, and that no surveys were made to evaluate/determine beta radiation exposure rate levels in the cavity. Some work performed by the workers in the cavity was near the cavity walls where a beta exposure rate field would be expected to exist; the gamma exposure rate was up to 50 mrem/hr. The workers wore their film badges inside a chest pocket in their protective clothing; therefore, the film badge was not a good indicator of beta dose received. Failure to establish beta dose equivalent rates in the cavity is considered noncompliance with Technical Specification 6.11 and Procedure HSP-02.6, Section 5.9 (violation 409/86003-01). This matter was discussed at the exit meeting.

One violation was identified.

7. Internal Exposure Control and Assessment

The inspector reviewed the licensee's internal exposure control and assessment program, including: changes in facilities, equipment, personnel, and procedures affecting internal exposure control and personnel assessment; determination whether engineering controls, respiratory equipment, and assessment of individual intakes meet regulatory requirements; required records, reports, and notifications; effectiveness of management techniques used to implement these programs, and experience concerning self-identification and correction of program implementation weaknesses.

The licensee's program for controlling internal exposures includes the use of respirators and equipment, the control of surface contamination, and the control of airborne radioactivity. A selected review of airborne radioactivity survey results was made. No significant problems were noted.

The licensee performs routine whole body counts on radiation workers twice each year and whenever an intake is suspected. The inspector reviewed whole body count results for counts conducted during 1986 to date. No result exceeding the 40 MPC-hour control measure was noted. Several follow-up counts were performed on persons who displayed initial elevated counts; all elevated counts were found to be minor external contamination which was readily removed by showering; no significant activity was detected in these individuals by whole body counting after showering.

The licensee's respiratory protection program remains as described in Inspection Report No. 50-409/85005.

No violations or deviations were identified.

8. Control of Radioactive Materials and Contamination

The inspector reviewed the licensee's program for control of radioactive materials and contamination, including: adequacy of supply, maintenance, and calibration of contamination survey and monitoring equipment; effectiveness of survey methods, practices, equipment, and procedures; adequacy of review and dissemination of survey data; and effectiveness of methods of control of radioactive and contaminated materials.

To improve contamination controls, the licensee has terminated the permitted use of laboratory coats as protective clothing in contaminated areas while touring or performing some limited work; Procedure Section 6.6 of Operating Manual, Volume X was revised to reflect the new laboratory coat use policy.

The licensee has redefined contaminated areas to permit the wearing of protective coveralls between contaminated areas where the smearable contamination levels are relatively low ($>2,000$ dpm/ft² but $<15,000$ dpm/ft²), when more than one of these areas is to be entered. For areas $>15,000$ dpm/ft², all protective clothing must be removed before leaving the contaminated area. No adverse consequences of this change has been experienced; the change was implemented in January 1986.

During tours of the turbine building, the inspector noted that several step-off-pad and associated used clothing receptacle areas were poorly laid out and could lead to the spread of contamination beyond step-off-pads to clean areas. This matter was discussed with licensee representatives during the inspection and at the exit meeting.

The licensee has reduced the number and extent of contaminated areas and has reduced the contamination levels in some contaminated areas. No records of contaminated area extent are maintained.

The inspector noted that an obsolete counting room shielding cave has been installed near the exit door inside the Waste Disposal Building. The shielding cave, which is about five feet high and three sided (large enough to stand in). The cave is now used as a frisking booth. The background in the booth is about 200 count per minute on a pancake probe frisker. Installation of the cave is a significant improvement and cures a long-standing problem. The inspector observed that all persons leaving containment were using the frisker near the containment airlock.

No violations or deviations were identified.

9. Interim Radwaste Storage Facility (IRSF)

The licensee has built an IRSF for storage of low specific activity dry waste packaged in 55-gallon drums. No remote barrel handling equipment is installed, nor is shielding except for solid concrete block lined walls up to about six feet. No liquid or reactive contents are permitted.

The storage building is made of metal and concrete; no combustible construction materials were used.

The licensee has no plans for construction of additional extended storage facilities for solidified wastes or dewatered resins; original storage area may be adequate. Should the need for additional space be identified, the licensee stated that it will be built in accordance with existing guidance.

No violations or deviations were identified.

10. IE Information Notices

The inspector reviewed licensee actions in response to the following IE Information Notices. The actions are considered adequate.

No. 85-81: Problems Resulting in Erroneously High Reading with Panasonic 800 Series Thermoluminescent Dosimeters. The licensee does not use these dosimeters.

No. 85-92: Surveys of Wastes Before Disposal from Nuclear Reactor Facilities. The licensee is releasing no materials, that have been within radiologically controlled areas, for burial or burning as nonradioactive materials except for computer paper that is counted in a GeLi counter before release is permitted.

11. Hydrogen Ignition in an Offgas Sampling Rig

On March 6, 1986, a senior health physics technician set up a portable sampling system to sample particulate and radioiodine activity in the operational offgas line both upstream and downstream of the on-line offgas system final HEPA filter and charcoal adsorber bank. The sampling was being conducted to test the collection efficiency of the HEPA filter and charcoal adsorber using a differential radionuclide concentration method.

The sampling equipment consisted of new tygon tubing, a flowmeter, an aluminum filter paper holder containing an acetate filter paper, and a dual cartridge holder containing two plastic cartridges containing silver zeolite. The silver zeolite had been dehydrated by the manufacturer to less than five percent moisture. Past sampling of the offgas line was performed using two standard two inch charcoal cartridges instead of silver zeolite cartridges. Silver zeolite cartridges were substituted because they adsorb less noble gaseous activity than charcoal cartridges and, therefore, reduce sample analysis interferences.

Two minutes after starting the sampling equipment (flow rate of 0.6 cfm), the technician noted that water droplets had formed on the inside of the tygon tubing downstream of the filter holders. One minute later, the technician heard a loud bang and saw a bluish flash inside the sample tubing. The technician then turned off the sampling pump, isolated the sampling lines, and inspected the sampling equipment. The tygon tubing was a burnt brown color; the inside of the flow meter was covered with a brown-colored oil film; the cartridge holder was hot, difficult to open, and had a burned odor when opened; plastic parts of the zeolite filters and holder displayed some melting and were fused; the plastic retaining screens in the zeolite holders were no longer intact; and the particulate filter had disintegrated.

The licensee believes that an ignition began in the sample holder and that sufficient H_2 must have been present in the sample lines to sustain an ignition; sufficient H_2 could be present if the offgas system catalytic recombiner, located upstream of the filters being tested, were not operating optimally; there is no H_2 monitor. The licensee's Radiation Protection Engineer discussed the potential of H_2 and O_2 recombination catalysis by silver zeolite at ambient temperatures with two outside suppliers. It was determined that dehydrated silver zeolite will absorb moisture from the sample stream until it reaches hydration. During this hydration, which creates a slightly exothermic reaction, the silver zeolite granules will heat up. During this heating, additional H_2 and O_2 alignment with the silver zeolite molecules may occur, and some controlled catalytic recombination may occur; this may further increase the silver zeolite granules' temperature. At about 150°F, the silver zeolite will reach its threshold temperature for H_2 and O_2 catalytic recombination. At this threshold temperature, the silver zeolite may cause a rapid recombination (ignition) of H_2 and O_2 if the H_2 is above a four percent concentration. This may rapidly generate temperatures inside the silver zeolite in excess of 1065°F.

The offgas system continued to operate after the ignition. There were fluctuations in effluent noble gas, particulate, and halogens for several hours after the ignition; no alert setpoint was reached. The licensee noted an increase in the temperature of the offgas storage tanks and the catalytic recombiner (monitored parameters). The system slowly returned to near normal except that an identifiable increase in halogen and particulate effluent remained; these remaining increases indicate a possible degradation of the final HEPA filter and charcoal adsorber. The licensee plans to inspect the filter bank for damage and replace the HEPA and charcoal as necessary during this outage.

Several tentative licensee recommendations resulted from their review of this incident. These recommendations, listed below, are being further reviewed by the licensee before implementation.

- Charcoal cartridges be used to sample offgas for radioiodines.
- A portable H₂ analyzer be procured and be used for checking for H₂ before radioiodine sampling begins.
- Partially hydrated silver zeolite cartridges, or other noncatalyzing cartridges, be used for post-accident sampling of stack effluent.
- Silver zeolite should not be used for post-accident containment sampling unless H₂ concentration is less than four percent.
- During the refueling outage, the offgas catalytic recombiner should be removed, cleaned, and replaced if necessary.
- Gland steam flow rate and its effect on optimal operation of the catalytic recombiner should be investigated.

The licensee's investigation of this incident was timely, thorough, and performed in a professional manner.

No violations or deviations were identified.

12. Regulatory Improvement Program (RIP)

(Closed) RIP Task (409/RP-00N-1) Review and upgrade contamination control measures. The licensee has reduced the number of contaminated areas, reduced contamination levels in contaminated areas, improved methods used to minimize contamination spread, and improved personnel contamination detection methods and equipment.

13. Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) at the conclusion of the inspection on March 14, 1986. The inspector summarized the scope and findings of the inspection. The inspector also discussed the likely information content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary. In response to certain items discussed by the inspector, the licensee:

- a. Acknowledged the violation (Section 6).
- b. Acknowledged the inspector's comment about the apparent overburdening of the radiation protection staff during outages (Section 4).
- c. Acknowledged the inspector's comment that the follow-up and report concerning the hydrogen ignition in an offgas sampling rig was well done (Section 11).
- d. Acknowledged the inspector's comment about an apparent need to improve step-off-pad areas (Section 8).