



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

June 16, 1980

TERA

Docket No. 50-409

Mr. Frank Linder
General Manager
Dairyland Power Cooperative
2615 East Avenue South
LaCrosse, Wisconsin 54601

Dear Mr. Linder:

We have reviewed your submittals in regard to fire protection modifications at the LaCrosse Boiling Water Reactor as indicated in Enclosure 1 to this letter. The status of our evaluation is also indicated in the same enclosure. Enclosure 2 states our requirements for additional information or for modifications to enhance fire protection capability. Enclosure 3 is the report of our fire protection consultants relating to each of the items.

Please respond to the items in Enclosure 2 within 30 days of receipt of this letter.

Sincerely,

A handwritten signature in cursive script, appearing to read "G. C. Lainas".

Gus C. Lainas, Assistant Director
for Safety Assessment
Division of Licensing

Enclosures (1-3):
As stated

cc w/enclosures:
See next page

cc w/enclosures:

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ENCLOSURE 1

LACROSSE BOILING WATER REACTOR - FIRE PROTECTION SER SUPPLEMENT
List of Submittals and Status of Associated Issues

	<u>SUBMITTALS</u>	<u>STATUS</u>
3.1.3 Interior Hose Stations	2/6/80	R
3.1.4 Fixed Suppression Systems	2/6/80	R
3.1.5 Heat Detector Circuit Supervision	2/6/80	R
3.1.6 Breathing Air	2/6/80	R
3.1.13 Protection of Service Water Piping	2/6/80	R
3.1.14 Neutron Shields	2/6/80	C
3.1.20 Unrated Barrier	2/6/80	R
3.1.22 Protection for Electrical Equipment and Control Rooms	2/6/80	R
3.1.24 Fire Hazard in Waste Building		L
3.1.25 Gas Suppression System Actuation	2/6/80	R
3.1.27 Combined Water Demand (see 3.2.2)	3/11/80	I ¹
3.1.29 Signaling System	2/6/80	R
3.2.1 Safe Shutdown Analysis		I ¹
3.2.2 Fire Water System	3/11/80	I ¹
3.2.3 Fire Pump Performance		L
3.2.4 Exposed Steel in Turbine Building		L
3.2.5 Security Modification of Fire Doors	1/31/79	R
3.2.6 In-Situ Detector Testing		I
3.2.7 Circuit Interaction Study		I ¹
3.2.8 Fire Water Supply Reliability		I

C - Completed R - Requirement
I - Incomplete L - Licensee's submittals is late.
I¹ - Staff's Evaluation Not Complete

LACROSSE BOILING WATER REACTOR - FIRE PROTECTION SER SUPPLEMENT
Staff Requirements

3.1.3 Interior Hose Stations

We will require the licensee to:

1. Identify all safety-related areas, and other areas containing major fire hazards, which the hose reach tests identified to have inadequate manual hose coverage.
2. Propose necessary modifications to assure that all points on safety-related areas, and areas which contain major fire hazards, can be effectively reached with at least one hose stream.

3.1.4 Fixed Suppression System

We will require the licensee to:

1. Submit design drawings and hydraulic calculations to verify that the design of the sprinkler system protecting the turbine oil reservoir is satisfactory and the water supply is adequate.
2. Provide the design description of the lube oil system and verify that the system will meet the following criteria,
 - a. The proposed system provides a complete enclosure for all potential leakage points, including lift pump and piping, external oil cooler, flanged connections, drain plugs, fill points, upper and lower reservoirs, sight glasses, and overflow lines.
 - b. During a safe shutdown earthquake, the effects of the seismic event on the system will not adversely affect plant safety.
 - c. Strainers or other means of preventing clogging of drain piping are provided; or the system is capable of containing the entire content of lube oil in each pump.

3.1.5 Heat Detector Circuit Supervision

We will require the licensee to provide a supervisory device listed by UL or FM for the intended purpose.

3.1.6 Breathing Air

We will require the licensee to:

1. Indicate the rate at which the cascade system could refill the breathing air bottles.
2. Verify that eight breathing apparatus can be supplied for a period of six hours.

3.1.13 Protection of Service Water Piping

We will require the licensee to provide the heat transfer calculation to demonstrate the proposed insulation is adequate to prevent overheating of service water.

3.1.20 Unrated Barrier

We will require the licensee to:

1. Upgrade the fire resistance of the wall to a three hour rating, based on the estimated fire resistance rating of 1.3 hours for the existing wall.
2. Document the proposed modifications prior to implementation.

3.1.22 Protection for Electrical Equipment and Control Rooms

We will require the licensee to submit design descriptions of the proposed automatic suppression system in the electrical equipment room prior to installation. If a water system is to be provided, the licensee should provide sprinkler layout drawings and calculations or other information to assure the adequacy of water supply (pressure and flow).

If a gas system is proposed, the licensee should provide the design density, soak time, means of actuation, interlocks (with fire door, fire dampers, etc.), power supply and supervision.

The licensee is also required to verify that the suppression system is in compliance with applicable NFPA Codes.

3.1.25 Gas Suppression System Actuation

We will require the licensee to submit the design description of the proposed modification prior to implementation.

3.1.29 Signaling System

We will require the licensee to:

1. Submit Attachment C to their February 6, 1980 letter. This attachment was omitted from the letter.
2. Verify that the maximum timer setting possible does not exceed two hours.
3. Confirm their verbal commitment that administrative procedure will be developed to test sprinkler system water flow alarms at two month intervals, and to perform sprinkler system drain tests following operation of system control valves.

3.2.2 Fire Water System

We will require the licensee to submit the study of the fire water system that was scheduled to be submitted by February 15, 1980.

3.2.5 Security Modification of Fire Doors

We will require the licensee to submit documentation demonstrating that following the modifications necessary for installation of electric door strikes, the fire door frames still comply with the applicable provisions of UL Standard 63, Fire Door Frames (Fifth Edition).

ENCLOSURE 3

BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.

Upton, New York 11973

Department of Nuclear Energy

(516) 345- 2144

March 26, 1980

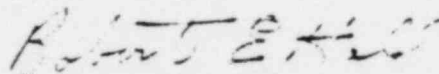
Mr. Robert L. Ferguson
Plant Systems Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: LaCrosse, Fire Protection Review, Items 3.1.3, 3.1.4, 3.1.5, 3.1.6,
3.1.13, 3.1.14, 3.1.20, 3.1.22, 3.1.25, 3.1.19, 3.2.2, 3.2.5, 3.2.6.

Dear Bob:

Attached are all the LaCrosse fire protection review items for which we
have received licensee information.

Respectfully yours,



Robert E. Hall, Group Leader
Reactor Engineering Analysis

REH:EAM:sd
attachment

cc.: D. Eisenhuc
W. Kato wo/att.
T. Lee
M. Levine wo/att.
E. MacDougall
V. Panciera
E. Sylvester

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8. 0410

We will complete our evaluation of Section 3.1.3 (1) when the required information has been received. We recommend that the staff accept the licensee's response on Items (2) and (3).

Item 3.1.4 - Fixed Suppression Systems

SER Section 3.1.4 indicates that:

- (1) The automatic sprinkler system protecting the turbine oil reservoir will be extended to also protect the associated turbine oil piping;
- (2) An automatic water fire suppression system or an oil shield and collection system will be provided to protect or prevent an oil fire at the reactor coolant recirculation pumps;
- (3) An automatic fire suppression system will be provided to protect the "A" diesel generator room;
- (4) A fixed dry pipe sprinkler system capable of quick connection to a manual hose will be provided on the exterior side of the cable penetration of containment;
- (5) An automatic water suppression system will be provided to protect against a fire in the outside transformers.

By letter dated February 6, 1980, the licensee stated that:

- (1) The automatic sprinkler system over the turbine oil reservoir was extended to protect the associated piping on May 8, 1979;
- (2) An oil shield and collection system is to be installed. The installation, at the date of the letter, was approximately 50 percent complete, with the remainder to be completed during the next refueling or other outage of sufficient duration to allow access to the recirculation cubicle;
- (3), (4) and (5) Design details for the suppression systems are not available at this time.

No drawings, design criteria or other details needed to evaluate the sprinkler system protecting the turbine oil reservoir and associated piping have been provided. We recommend that the staff request that the licensee submit design drawings and hydraulic calculations to verify that the sprinkler system design is satisfactory and the water supply is adequate.

The drawing included in the licensee's response as page nine "Oil Dripshield for Forced Circulation Pumps," does not provide sufficient details for a complete evaluation. We will require the lube oil collection system to meet the following criteria:

- The proposed system provides a complete enclosure for all potential leakage points, including lift pump and piping, external oil cooler, flanged

LACROSSE BOILING WATER REACTOR

FIRE PROTECTION REVIEW

Item 3.1.3 - Interior Hose Stations

SER Section 3.1.3 indicates that:

- (1) Hose reach tests would be performed and additional hose stations provided as necessary to insure all points in safety-related areas, and areas which contain major fire hazards, can be effectively reached by at least one hose stream;
- (2) Tests and calculations will be performed to confirm that the pressure at each fire hose station outlet is greater than or equal to 65 psig with 100 gpm flowing;
- (3) Administrative controls will be established to prevent access to manual fire fighting equipment from being restricted by temporary storage of materials within the plant.

By letter dated February 6, 1980, the licensee indicated that:

- (1) Hose reach tests were accomplished on December 15, 1978;
- (2) Flowing pressure at a fire hose station outlet in the containment is adequate with the one auxiliary high pressure service water pump (diesel fire pump) flowing 100 gpm;
- (3) LACBWR Administrative Control Procedure 40.1, issued February 19, 1979, requires that accessibility of manual fire fighting equipment be checked on a weekly basis.

In regard to Item (1), the licensee did not state if all areas could be effectively reached, or provide any test results. We recommend that the staff require the licensee to provide the results of the hose reach tests, and to propose necessary modifications to assure that all points in safety-related areas, and areas which contain major fire hazards, can be effectively reached with at least one hose stream.

Concerning Item (2), analysis of the pressure requirement at hose station shows that with the pump supplying 100 gpm the calculations are correct. However, with the pump supplying a total flow of 550 gpm, or more, the minimum 65 psig with 100 gpm flowing at the hose station is not met. Except under emergency accident conditions, which require the use of the alternate core spray or high pressure spray systems, the normal demand on the pump is about 75 gpm for the crib house screen wash. Therefore the requirement is met.

The licensee did not provide any details of the control procedure; however, the general description provided appears to be adequate.

connections, drain plugs, fill points, upper and lower reservoirs, sight glasses and overflow lines.

- During a safe shutdown earthquake, the effects of the seismic event on the system will not adversely affect plant safety.
- Strainers or other means of preventing clogging of drain piping are provided.

We will complete our evaluation of licensee responses following the receipt of required design details.

Item 3.1.5 - Heat Detector Circuit Supervision

SER Section 3.1.5 indicates that the circuits of heat detectors which actuate the carbon dioxide suppression system protecting the "B" diesel generator room will be electrically supervised for power failure, ground faults or circuit breaks and will alarm and annunciate these abnormal conditions in the control room.

By letter dated February 6, 1980, the licensee proposed to install a meter relay at the "end-of-line" thermo-switch circuit. This meter will monitor the voltage along the detector string for short circuits, open circuits and grounds. Any of these fault conditions cause the meter to read low. This fail-safe unit will have a remote annunciator in the control room.

We do not accept the licensee's proposal to install an "end-of-line" meter relay. The description of operation indicates that the proposed meter relay will not perform all the required functions; i.e., a ground fault condition on the neutral power leg will not be annunciated.

We recommend that the staff require the licensee to provide a supervisory device listed by UL or FM for the intended purpose.

Item 3.1.6 - Breathing Air

SER Section 3.1.6 indicates a six hour on-site breathing air reserve should be provided for each of the existing eight breathing units based on 20 minutes of air per bottle. Two spare bottles will be provided for each unit.

By letter dated February 6, 1980, the licensee indicated that 17 breathing air units and 12 spare air bottles are available on-site, and that the cascade recharging system has adequate capacity to provide the required air reserve.

The licensee's response did not indicate the rate at which the cascade system could refill the breathing air bottles. We recommend that the staff request the licensee provide this information and verify that, including the time to transport the bottles to and from the fire fighters, the required number of fire fighters can be supplied for a period of 6 hours.

We will complete our evaluation of this item following receipt of the required information.

Item 3.1.13 - Protection of Service Water Piping

SER Section 3.1.13 indicates that the licensee has provided protection for the service water pipes and their supports in the oil storage room against a fire in the room.

By letter dated February 6, 1980, the licensee indicated that the high pressure service water and low pressure service water piping and hangers in the oil storage room have been insulated with a 2 inch layer of Owens-Corning KAYLO 10 pipe insulation and covered with metal. The licensee has estimated that this insulation would provide a fire resistive rating of at least four hours based on a comparison with similar materials.

The licensee has provided no documentation or calculations supporting his claim of equivalent four hour fire resistance rating for the insulation material. The information provided by the licensee on the KAYLO 10 asbestos free pipe insulation indicates a service temperature of 1200°F, lower than might be expected during a fire. Based on our analysis of the information provided, we do not accept the licensee's modification. We recommend that the staff require the licensee document the fire resistance of KAYLO 10 by test or analysis or use an insulation design approved for the intended purpose.

Item 3.1.14 - Neutron Shields

SER Section 3.1.14 indicates that the polyurethane neutron shield blocks around the control rod drive system below the reactor will be replaced with those of noncombustible material.

By letter dated February 6, 1980, the licensee stated that they plan to replace the existing neutron shield blocks with Type 277 shielding, manufactured by Reactor Experiments, Inc. Based on manufacturer's literature provided by the licensee, the proposed shielding represents a significant improvement over fire hazards of the present shielding. We recommend that the staff accept the licensee's proposed modification.

Item 3.1.20 - Unrated Barrier

SER Section 3.1.20 indicates that the licensee will upgrade the unrated barrier between the "A" diesel room and the machine shop to provide a fire resistance commensurate with the hazards on both sides of the barrier.

By letter dated February 6, 1980, the licensee indicated that the door between "A" diesel room and the machine shop has been replaced by a door with three hour fire rating. Calculations were also provided estimating that the barrier has a fire resistance of 2.3 hours. A local contractor is also preparing a bid to upgrade the barrier to a 2.8 hour rating.

The licensee's estimate did not indicate the type of aggregate in the concrete block. A concrete block with the described dimensions and unknown aggregates has an estimated fire resistance rating of about 1.3 hours. We do not accept the licensee's calculations. We recommend that the staff require the licensee

to upgrade the fire resistance of the wall to a 3 hour rating, based on the estimated fire resistance rating of 1.3 hours for the existing wall. We recommend that the staff further require the licensee to document the proposed modifications prior to implementation.

Item 3.1.22 - Protection for Electrical Equipment and Control Rooms

SER Section 3.1.22 indicates that the licensee will:

- (1) Relocate record file cabinets stored in the electrical equipment room out of safety-related areas;
- (2) Provide an automatic suppression system for the electrical equipment room;
- (3) Provide additional protection such as enclosure, coating, or automatic suppression for cables in the concealed spaces above the control room.

By letter dated February 6, 1980, the licensee indicated that the record file cabinet which had been stored in the electrical equipment room was relocated out of safety-related areas on January 21, 1980. The licensee also indicated that wiring located above the control room ceiling consists of normal lighting and emergency lighting, three paging system speakers, and security system wiring. All this wiring is in conduit mounted above a "see-through" grid ceiling. Three exposed cables are also located above this ceiling. Two of these are used for remote alarm and reset for high radiation entry alarm, and the third is used during refueling outages for closed circuit television signals.

Lighting cables are G.E. polyurethane-flamencol cable, paging speakers are two conductor PVC, and security wiring is 24 pair, 3 cable polyurethane. High radiation alarm and reset is two conductor two cable PVC, and the closed circuit television cable is one conductor, polyurethane coaxial.

The licensee indicated that none of the few cables above the control room are safety related, and therefore, no further protection is required in this area.

We accept the licensee's modification regarding the record file cabinet in the electrical control room and the licensee's response regarding wiring above the control room ceiling. We will require the licensee to submit design details on the proposed automatic suppression system in the electrical equipment room.

Item 3.1.25 - Gas Suppression System Actuation

SER Section 3.1.25 indicates that the licensee will:

- (1) Provide the actuation power for the carbon dioxide system that protects the "B" diesel room from the essential service bus which derives the on-site backup power from the "A" diesel generator;
- (2) Modify the emergency manual release of the carbon dioxide system to conform with the provisions of NFPA 12-1977, Section 1-8.3.5. "All valves controlling the release and distribution of carbon dioxide

shall be provided with an emergency manual control. This does not apply to slave high pressure cylinders. It is possible for the normal manual control to qualify as the emergency manual control if the provisions of 1-8.1 are satisfied.

The emergency means, preferably mechanical, shall be easily accessible and located close to the valves controlled. If possible, the system should be designed so that emergency actuation can be accomplished from one location. This does not apply to slave high pressure cylinders."

By letter dated February 6, 1980, the licensee indicated that the activation power circuit for the carbon dioxide system will be modified as required by June 1, 1980, and that the emergency manual release for the carbon dioxide system in the 1B diesel generator room will be modified by adding two remote manual releases in the adjacent electrical equipment room.

The licensee's response did not include any design details of the proposed modifications to the actuation power circuit. We will require the licensee to submit the details of the proposed modification.

We recommend that the staff accept the licensee's proposed modification of the emergency manual release for the carbon dioxide system.

We will complete our evaluation following receipt of the required actuation power design details.

Item 3.1.29 - Signaling System

SER Section 3.1.29 indicates that:

- (1) The licensee will test the sprinkler system water flow alarm at two month intervals.
- (2) The licensee will perform sprinkler system drain tests following operation of system control valves;
- (3) The licensee will install a timer for each detector zone to provide warning when the detector zone has been bypassed for a certain period of time.

By letter dated February 6, 1980, the licensee indicated that a timer is being installed in each detector zone by August 1, 1980. The licensee's response included a brief operational description, but the referenced circuit drawings (identified as "Attachment C") were missing from the submittal. We have not received the licensee's response to Items (1) and (2).

The operational description of the timing circuits included in the licensee's response appears to be adequate except that Attachment C was not included and the licensee did not indicate the maximum timer setting. We recommend that the staff require the licensee submit Attachment C and indicate the maximum timer setting. We also recommend that the staff require the licensee confirm their

commitment to test sprinkler system water flow alarms at two month intervals, and perform sprinkler system drain tests following operation of system control valves.

We will complete our evaluation following receipt of the required information.

3.2.2 - Fire Water System

SER Section 3.2.2 indicates that the licensee will provide the results of the study of the arrangement of the fire pumps in the yard main piping which will assure that a sufficient number of pumps are available to meet the fire water demand at all times, taking into account the possibility of a fire involving both diesel driven fire pumps, failure of a fire pump, or failure of a section of the fire water piping system. The study will include consideration for (1) separate pump feeds to the yard main, (2) additional sectional valves, and (3) interconnection with the fire water system at adjacent fossil units.

By letter dated February 6, 1980, the licensee indicated that Nuclear Energy Services has completed a study of the LACBWR fire water system and combined water demand. A draft of this study has been reviewed by LACBWR staff and is presently being revised to incorporate minor changes. It is anticipated that the final study of the draft of the fire water system and the combined demand study will be submitted to the NRC by February 15, 1980.

We have not yet received the licensee's report. We will complete our evaluation following receipt of the required information.

3.2.5 - Security Modification of Fire Doors

SER Section 3.2.5 indicates that the licensee has provided further documentation to demonstrate that the fire resistance rating of those fire door assemblies provided with physical security modification are not reduced by the modification.

By letter dated January 31, 1979, the licensee had provided documentation that the installed electric door strikes are Underwriters' Laboratories listed for fire and burglary services.

The fire performance of a fire door and frame assembly depends in part on adequate reinforcement of the frame in the area of the strike-plate. The licensee has not shown that the door frames now comply with the provisions of Section 6 of UL Standard 63, Fire Door Frames, relating to strike-plate reinforcements. We recommend that the staff require the licensee to submit further documentation demonstrating that following modifications necessary for installation of the electric door strikes, the fire door frames still comply with the applicable provisions of UL Standard 63, Fire Door Frames (Fifth Edition). We will complete our evaluation following receipt of the required information.

3.2.6 - In-Situ Detector Testing

SER Section 3.2.6 indicates that the licensee has provided a description and acceptance criteria for the in-situ tests for the fire detectors. This information is currently being reviewed.

The licensee's submittal did not provide sufficient detail for the staff to determine the acceptability of the method as a means of verifying the adequacy of the type, number and distribution of fire detectors in the plant. Recent studies have indicated that the type of test envisioned by NRC is probably beyond the present state of the art. NRC is in the process of developing alternative acceptance criteria for fire detector installations. We will address this issue when such criteria become available.