

August 30, 1982

Docket No. 50-409
LS05-82-08-068

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

Dear Mr. Linder:

SUBJECT: SEP TOPIC II-1.C, POTENTIAL HAZARDS DUE TO NEARBY TRANSPORTATION,
INSTITUTIONAL, INDUSTRIAL AND MILITARY FACILITIES - LACROSSE

Enclosed is a copy of our final evaluation of SEP Topic II-1.C. The evaluation is based on our review and modification of your topic assessment report of September 15, 1981.

The evaluation concludes that your facility is adequately protected and can be operated with an acceptable degree of safety with regard to industrial, transportation and military activities in the vicinity of the plant.

This evaluation will be a basic input to the integrated safety assessment for your facility unless you identify changes needed to reflect the as-built conditions at your facility. This assessment may be revised in the future if your facility design is changed or if NRC criteria relating to this subject is modified before the integrated assessment is completed.

Sincerely,

Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

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SYSTEMATIC EVALUATION PROGRAM
TOPIC II-1.C

LACROSSE

TOPIC: II-1.C, POTENTIAL HAZARDS DUE TO NEARBY TRANSPORTATION, INSTITUTIONAL AND MILITARY FACILITIES

I. INTRODUCTION

The safety objective of this topic is to ensure that the integrity of the safety-related structures, systems and components would not be jeopardized due to the potential for hazards originating at nearby facilities.

II. REVIEW CRITERIA

General Design Criterion 4, "Environmental and Missile Design Basis," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires that nuclear power plant structures, systems and components important to safety be appropriately protected against events and conditions that may occur outside the nuclear power plant.

III. RELATED SAFETY TOPICS

Topic III-4.D, "Site Proximity Missiles" reviews the extent to which the facility is protected against missiles originating from offsite facilities.

IV. REVIEW GUIDELINES

The review was conducted in accordance with the guidance given in Standard Review Plan (SRP) Section 2.2.1, 2.2.2 and 2.2.3.

V. EVALUATION

There is little industrial activity in the vicinity of LACBWR. There is a fish hatchery located approximately three miles south of the plant. The nearest concentration of industrial activity is located in LaCrosse, approximately 18 miles north. The Dairyland Power Cooperative site on which LACBWR is situated also contains a 14 MWe oil-fired unit, which is maintained on standby status and a 350 MWe coal-fired plant.

The nearest highway to the plant is Wisconsin State Highway No. 35. The minimum distance between the traveled portion of the highway and the reactor building is approximately 520 feet. The guidance of Regulatory Guide 1.91, Revision 1, was utilized to evaluate the consequences of a postulated explosive accident on the highway. Area specific statistics were not available, so general statistics were used. The accident rate for hazardous material shipment is approximately 1.69 per million vehicle miles. Fire occurs in 1.57% of reportable truck accidents (Reference 1). Most fires involve only the fuel from

the vehicles fuel tanks. A conservative assumption was made that the proportion of truck accidents in which the cargo explodes is not greater than the percentage in which fire occurs. The exposure distance for trucks carrying explosives was determined to be 0.53 miles, using the method in Regulatory Guide 1.91. Using the formula $r = nfs$, where r is exposure rate, n is the explosion rate, f is the frequency of shipments and s is the exposure distance, r is approximately $1.4 \times 10^{-8}f$. The frequency of shipments of explosives on Highway 35 is not known, but a review of the surrounding area shows there would be extremely few, if any, truck shipments of explosives past the plant. Highway 35 is a two lane highway passing through towns along the Mississippi River. The largest city to the south of the plant is Prairie du Chien, while LaCrosse is the major city to the north. There are no known manufacturers of explosives near either city (Reference 2). LaCrosse is serviced by Interstate Highway I-90, on which the majority of non-local generated traffic travels. Since there are no industries in the vicinity of LACBWR which utilize explosives, the number of trucks carrying explosives passing the plant would be extremely small. Therefore, it is our judgement that the threat to the safe operation of the plant posed by highway accidents involving explosives is sufficiently remote so that such accidents need not be considered as a design basis event.

The potential consequences of highway accidents involving chemicals were also evaluated. Toxic chemicals which form a gas cloud when released could possibly reach the plant in concentrations high enough to be of concern depending on such factors as spill size and atmospheric dispersion conditions. The wind blows from the direction of the road towards the plant less than 10% of the time (Reference 3). No data exists for the likelihood of accidents involving toxic chemicals occurring on Highway 35. Accident data have been compiled for the neighboring state of Michigan, however, the expected frequency of an accident involving hazardous chemicals on the approximately ten-mile stretch of US Route 31 past Big Rock Point was calculated to be about 1.3×10^{-3} per year (Reference 4). Wisconsin State Highway 35 is a two lane road, as compared to US Route 31, which is a four lane highway. Therefore, traffic and hence, the frequency of an accident, should be no greater on Highway 35 than US Route 31. The percent of tanker truck accidents which involve a significant loss of material is about 2% (Reference 5). Thus, the potential annual exposure rate to the plant due to toxic chemical accidents on Highway 35 can be conservatively estimated at 3×10^{-6} per year.

The probability of toxic chemicals exposure is higher than the NRC staff objective of approximately 10^{-7} per year. SRP 2.2.3 does state that expected rates of occurrences of approximately 10^{-6} is acceptable if, when combined with reasonable qualitative arguments, the realistic probability can be shown to be lower. The frequency used for toxic chemical accidents is based on toxic chemical traffic on highways throughout the state of Michigan. Since there are no industrial complexes in the vicinity of LACBWR which would generate toxic chemical traffic, the rate would probably be somewhat lower on Wisconsin

State Highway 35. Therefore, it is our judgement that the threat to the safe operation of the plant posed by highway accidents involving toxic chemicals is sufficiently remote so that such accidents need not be considered as a design basis event.

Two main tracks of the Burlington Northern Railroad pass LACBWR at a minimum distance of 475 feet east of the reactor (Reference 6). There are approximately 20-30 freight trains daily (Reference 7). The consequences of a postulated explosion on the railroad were evaluated in accordance with the guidelines in Regulatory Guide 1.91, Revision 1. The accident rate involving fire is approximately 2.1×10^{-9} train accidents involving fire per car mile traveled (Reference 8).

The explosion accident rate should be less than the fire accident rate, since while the majority of explosions cause fires, the majority of fires do not result from explosions. Burlington Northern Company searched their records and found one train car carrying explosives had passed LACBWR during a one month period, a rate of 12 train cars per year (Reference 9). The track exposure distance is 0.76 miles. Therefore, the exposure rate is conservatively 2×10^{-8} per year, which is less than 10^{-7} per year. Therefore, the risk to the plant for a train carrying explosives is sufficiently low.

The probability of a train accident involving hazardous chemicals was also examined. Burlington Northern Company had performed a survey on hazardous chemicals passing through the area of the Prairie Island site. They identified seventeen hazardous chemicals which were transported past Prairie Island. (See Table 1.) Since the tracks near Prairie Island are the same as those passing LACBWR, it can be assumed that approximately the same amount of toxic chemicals were shipped by train past LACBWR.

Regulatory Guide 1.78 requires that chemicals shipped more than 30 times annually should be considered in the evaluation of control room habitability. Control room habitability is being evaluated as part of the TMI Task Action Plan, NUREG-0737, Task III.D.3.4. Potential problems and their solutions will be identified as part of that review, independent of the SEP Program. This evaluation will, however, identify chemicals of potential interest. The results of the Burlington Northern Company survey showed two chemicals, anhydrous ammonia and hydrochloric acid, which may be hazardous and are evaluated under the TMI Task Action Plan.

The bank of the Mississippi River is approximately 300 feet from the Reactor Building (Reference 11). A survey of all barge traffic on the Mississippi River, from Minneapolis to the mouth of the Missouri River, excepting upbound traffic going to the Illinois River was consulted (Reference 12). Conservatively, all other traffic was assumed to pass

LACBWR. The amount of hazardous chemicals shipped is shown in Table 2. Chemicals whose shipping frequency exceeds 50 shipments per year were categorized as Basic Chemicals and Products, Nitrogenous Chemical Fertilizers (Ammonia), Fertilizers and Materials, Gasoline and Distillate Fuel Oil. These chemicals will be considered further in doing the evaluation of control room habitability under the TMI Action Plan.

U. S. Lock and Dam No. 8 is about 3/4 mile north of the plant. The contents of barges passing through the lock are required to be identified. Personnel at Lock and Dam No. 8 were consulted and had no recollection of barges carrying explosives passing through the lock. Therefore, it can be concluded the frequency of barges transporting explosives past LACBWR is very low. The probability of a severe barge accident causing a fire lasting 1/2-1 hour is 1.3×10^{-9} per mile, while that for a severe accident resulting in a longer fire is 9.3×10^{-11} per mile (Reference 13). An accident causing an explosion can definitely be categorized as a severe accident, if not an extra severe accident, which has an even lower probability. Due to the low probability of a severe barge accident, it is our judgement that the threat to the safe operation of the plant posed by accidents resulting in explosions of barge shipments is sufficiently remote so that such accidents need not be considered as a design basis event.

The effect of barge impacts on the intake structure were not evaluated since the plant has an alternate method of providing service water, which is not affected by barge impacts on the intake structure. This Emergency Service Water Supply System consists of the following:

1. At least three portable gasoline engine-driven pumps connected in parallel and capable of delivering a combined flow of 900 gpm against a pressure of 50 psig within the reactor vessel.
2. An operable flow path from the Mississippi River, consisting of pump suction and discharge hoses, a three-way ball valve distributor, and relay hoses capable of transferring water to a valved inlet manifold into the High Pressure Service Water piping system.

The system is described in Amendment No. 24 and Technical Specification 4.2.21 and 5.2.21.

The closest airport to LACBWR is the LaCrosse Municipal Airport, 25 miles north of the plant. A four-mile wide airway does include the airspace over the site. The airway's minimum allowed flying altitude is approximately 2,000 feet above the adjacent coal plant's 500 foot smokestack. In 1980 there were 89,000 flights (Reference 14) utilizing the airport. If the number of flights was conservatively assumed to be 100,000 and the target area to be the entire protected area, rather than plant buildings, the probability of an aircraft crashing into the plant can be calculated to be 6×10^{-7} per year

using the methodology in SRP 3.5.1.6. The calculated probability is greater than the actual probability would be, since it was assumed that all aircraft utilizing the LaCrosse Municipal Airport would be flying over the plant, while the majority do not. It can be concluded, therefore, that the airport does not represent an undue risk to the safe operation of the nuclear plant and meets the acceptance criteria of SRP 2.2.3.

The two closest military facilities are Fort McCoy, a National Guard training center, about 35 miles from LACBWR, and Camp Marshall, an air force reserve facility about 60 miles from LACBWR. LACBWR is not within the military operating area of Volk Field at Camp Marshall (Reference 15) nor does Fort McCoy schedule any flights in the vicinity of the plant (Reference 16). Flights originating from the Des Moines, Iowa National Guard Headquarters may pass over the plant. There are up to 15 flights per month during the summer in light or utility helicopters and about 5 trips per year in a light twin engine aircraft from Des Moines to Fort McCoy (Reference 17). The number of these military flights is negligible compared to the LaCrosse Municipal Airport traffic. Therefore, there is no additional risk to the plant from military aircraft.

There are no gas pipelines in the vicinity of the plant (Reference 18).

VI. CONCLUSION

We conclude that LACBWR is adequately protected and can be operated with an acceptable degree of safety with regard to industrial, transportation and military activities in the vicinity of the plant. Possible hazardous chemicals resulting from a barge or train accident have been identified as an item for further consideration in the overall evaluation of the habitability of the control room which is being done as part of the TMI Task Action Plan.

VII. REFERENCES

1. "Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Plants," WASH-1238, AEC, December 1972.
2. DPC letter, LAC-7668, Linder to Eisenhut, dated July 15, 1981, docketed August 10, 1981 (Reference 2).
3. LaCrosse Boiling Water Reactor Safeguards Report, August 1967.
4. NRC Letter, Crutchfield to Hoffman (Consumers Power), dated May 13, 1981.
5. *ibid*,

6. Safeguards Report.
7. DPC letter, LAC-7668, Linder to Eisenhut, dated July 15, 1981, docketed August 10, 1981 (Reference 7).
8. "Environmental Survey."
9. DPC letter, LAC-7668, Linder to Eisenhut, dated July 15, 1981, docketed August 10, 1981 (Reference 9).
10. "Prairie Island Control Room Toxic Chemical Study," Northern States Power.
11. Safeguards Report.
12. "Prairie Island."
13. "Environmental Survey."
14. DPC letter, LAC-7668, Linder to Eisenhut, dated July 15, 1981, docketed August 10, 1981 (Reference 14).
15. DPC letter, LAC-7668, Linder to Eisenhut, dated July 15, 1981, docketed August 10, 1981 (Reference 15).
16. DPC letter, LAC-7668, Linder to Eisenhut, dated July 15, 1981, docketed August 10, 1981 (Reference 16).
17. DPC letter, LAC-7668, Linder to Eisenhut, dated July 15, 1981, docketed August 10, 1981 (Reference 17).
18. DPC letter, LAC-7668, Linder to Eisenhut, dated July 15, 1981, docketed August 10, 1982 (Reference 18).

TABLE 1
CHEMICALS SHIPPED BY BURLINGTON NORTHERN PAST PRAIRIE ISLAND
(1 July 1979 - 5 July 1980)

<u>CHEMICAL</u>	<u>NUMBER OF SHIPMENTS</u>	<u>GROSS WEIGHT OF SHIPMENT (TONS)</u>	
		<u>AVERAGE</u>	<u>MAXIMUM</u>
Acetaldehyde	21	87.6	111
Ammonia, Anhydrous ⁽¹⁾	526	126.6	132.5
Carbon Bisulfide or Carbon Disulfide	1	30	30
Chlorine	15	88.3	98
Chlorine Trifluoride	1	32	32
Dimethyl Amine, Anhydrous	11	83.9	124
Hydrocyanic Acid	1	41	41
Hydrofluoric Acid, Anhydrous	8	53.9	76
Hydrochloric Acid ⁽¹⁾	162	90.2	127.9
Hydrochloric Acid Mixture	1	71	71
Hydrogen Sulfide	29	117.5	124.8
Irritating Agent, N.O.S.	1	30	30
Monochlorodifluoro Methane	2	119.5	127
Nitric Acid	4	51.5	51.5
Sulfur Dioxide	13	66.6	85
Vinyl Acetate	4	90.3	108
Vinyl Chloride	1	131	131

Chemicals shipped over 30 time/year need to be evaluated to determine the effect of an accidental spill on the control room operators.

TABLE 2
BARGE TRAFFIC ON THE MISSISSIPPI RIVER
CALENDAR YEAR 1977

<u>CHEMICAL</u>	<u>TONNAGE</u>	<u>SHIPMENT FREQUENCY</u> <u>SHIPMENTS/YEAR</u>
Alcohols	50131	17
Benzene And Toluene	109942	37
Sulfuric Acid	31037	10
Basic Chemicals And Products	577983	193
Nitrogenous Chemical Fertilizers	532410	177
Potassic Chemical Fertilizers	23714	8
Phosphatic Chemical Fertilizers	97700	33
Fertilizer And Materials	606711	202
Miscellaneous Chemical Products	9862	3
Gasoline	2718821	906
Jet Fuel	107506	36
Kerosene	25373	8
Distillate Fuel Oil	1337511	446
Naphta, Petroleum Solvents	63102	21
Liquified Gases	55325	18

Shipment frequencies were calculated using 3000 tons/barge capacity.