Wisconsin Electric POWER COMPANY
231 W. MICHIGAN, P.O. BOX 2046, MILWAUKEE, WI 53201

August 14, 1979

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. NUCLEAR REGULATORY COMMISSION
Washington, D. C. 20555

Dear Mr. Denton:

DOCKET NO. STN 50-502
ADDITIONAL INFORMATION - ENVIRONMENTAL REPORT
HAVEN NUCLEAR PLANT

This is to provide responses to your request of July 10, 1979, for additional information related to the Haven Nuclear Plant Environmental Report. Twenty-five (25) copies of Applicants' responses are enclosed.

Very truly yours,

C. W. Fay, Director
Nuclear Power Department

Enclosures

Copy to: Service List

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
WISCONSIN ELECTRIC POWER COMPANY, ET AL.	)	Docket No. STN 50-502
Haven Nuclear Plant	)	

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ENCLOSURE

WISCONSIN UTILITIES PROJECT

HAVEN NUCLEAR PLANT

APPLICANTS' RESPONSE

TO

U. S. NUCLEAR REGULATORY COMMISSION

REQUEST FOR ADDITIONAL INFORMATION

DATED JULY 10, 1979

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NRC COMMENT A.2 (NRC Letter dated July 10, 1979)

Questions regarding alternate sites transmitted by letters dated March 12, 1979 and April 21, 1979 remain outstanding.

RESPONSE

All questions transmitted by the NRC letters of March 14 and April 21, 1979, were answered by Applicants' responses of June 20, 1979.

NRC COMMENT A.1 (NRC Letter dated July 10, 1979)

Except as noted, all staff questions previously transmitted by letter of May 15, 1979 remain outstanding except for questions 33, 34, and 35, page 8. These questions have been eliminated.

RESPONSE

All questions transmitted by the NRC letter of May 15, 1979 were answered by Applicants' responses of June 20, 1979.

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NRC QUESTION 63 (NRC Letter dated July 10, 1979)

Statements in Section 2.2.2.2 (p's 9, 10) of the ER refer to effects on "environmental corridors associated with the development of a 2-reactor unit plant and natural draft cooling towers." Provide discussion of the effects on such corridors that will result from development of a single-unit reactor with once-through cooling.

RESPONSE

The only environmental corridor affected is that associated with the west branch of Seven Mile Creek. The effect on this corridor will remain the same regardless of the cooling system design, as stated in Section 14.4.1.4. The effects are described in Section 4.1.4.

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NRC QUESTION 64 (NRC Letter dated July 10, 1979)

Provide an estimate of the land area within the 5 miles of the Haven plant site that is used for agricultural purposes. Provide a similar estimate for woodland of forest vegetation. In the case of agricultural use, differentiate between cropland and pasturage.

RESPONSE

Agricultural land use within a 5 mile radius of the plant occupies approximately 70 percent of the land area or an estimated 18,500 acres. Woodlands occupy approximately 10 percent of the land area or an estimated 2,700 acres.

Pasturing of livestock is not practiced to any significant extent in area surrounding the site due to the high value of the land for crop purposes. Dairy farms in the area utilize exercise/feeding pens adjacent to barns to allow their herds to exercise. The exercise pens generally range in size from less than an acre up to 10 acres depending on the size of the herd involved. Within the 5 mile radius area such pens are estimated to occupy less than 500 acres. Some very limited pasturing of livestock also occurs on land adjacent to small streams and drainage courses in the area, primarily in areas unusable for other agricultural purposes.

Source: Mr. Eugene G. Hoye
Agricultural Agent
University Extension - Sheboygan County Office

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NRC QUESTION 65 (NRC Letter dated July 10, 1979)

Identify current and projected land use categories (by acreage or miles) for new right-of-way (ROW) required for Segment E of the proposed transmission line system (ER, page S.3.9-3). Provide similar information for portions of the Segment E required expanded ROW, and for "existing unused" ROW. Provide comparable information for each portion of Segment H (page S.3.9-4). Will alterations of Segment N and O require additional ROW? If so, indicate areas of land uses affected. Figure S.3.9-1 of the ER depicts transmission line Segments I and J. Are these segments parts of the proposed transmission system? If so, provide descriptions as for other Segments and indicate acreages (or miles) and types of land use affected.

RESPONSE

The attached table identifies existing land use for Segments E and H of the proposed transmission line system.

Projected land use along all portions of Segment E is the same as existing land use. Approximately 1.2 miles of the existing right-of-way to be widened by 48 feet for Segment H that is now used for agricultural purposes is projected to be converted to medium density residential usage (2.3 to 6.9 dwelling units per net residential acre). This is the only change in land use projected for the lands crossed by Segment H.

The restrings proposed for Segments N and O will not require any additional right-of-way.

Segments I and J depicted on Figure S.3.9-1 are due to a printing error. Segments I and J are not part of the proposed transmission additions.

Table I

Existing and Proposed Land Use

Segment E

Existing Land Use		Land Use Category						
ROW Type	Length	Agricul.	Agricul./ Wood	Woodland	Wood/ Wet	Wetland	Open/ Unused	Gravel Pit
New ROW	11.8 miles	8.4 miles	2.0 miles	0.9 miles	-	0.5 mile	-	-
Widened ROW	5.1 miles	3.0 miles	-	1.3 miles	0.7 miles	0.1 mile	-	-
Existing Unused ROW	19.1 miles	16.4 miles	-	1.5 miles	0.8 mile	0.4 mile	-	-
Restring Existing - No change in ROW	4.6 miles	3.1 miles	-	0.7 mile	0.5 mile	0.3 mile	-	-
Total Segment E	40.6 miles	30.9 miles	2.0 miles	4.4 miles	2.0 miles	1.3 miles	-	-

Segment H

Widening Existing ROW by 40 ft.	4.8 miles	3.9 miles	0.1 mile	0.4 mile	0.1 mile	0.1 mile	0.1 mile	0.1 mile
Hwy. I - Corridor	2.0 miles	1.6 mile	0.1 mile	0.1 mile	0.1 mile	0.1 mile	-	-
Widen Existing ROW by 30 ft.	1.0 mile	0.6 mile	-	-	0.2 mile	0.2 mile	-	-
Total Segment H	7.8 miles	6.1 miles	0.2 mile	0.5 mile	0.4 mile	0.4 mile	0.1 mile	0.1 mile

Source: WEPCo estimate based on Bay Lake Regional Planning Commission Aerial Photos taken May 1975.

NRC QUESTION 66 (NRC Letter dated July 10, 1979)

To facilitate comparisons of land use impacts associated with the proposed and alternate transmission system (Fig. S.10.9-1), identify current land use categories (by acreage or miles) for new ROW required for Segment E of the alternate transmission system (page S.10.9-3). Provide similar information for portions of the Segment E requiring expanded ROW (5.1 miles) and for the existing vacant ROW (19.1 miles). Also provide the kinds and acreages (or miles) of land uses affected by expanding the ROW of the 12.4-mile portion of Segment P that will be widened by 90 feet. Provide similar information for the 17.0-mile portion of Segment P that will be widened by 80 feet.

RESPONSE

Existing and projected land use along the 40.6 miles associated with Segment E is presented in the response to Question 65. The right-of-way requirements for the proposed and alternate Segment E are the same. The structure type and circuit arrangement differ for the initial 10.8 miles.

Existing and proposed land use along the 29.4 miles of alternate Segment P are as follows:

Along the westernmost 12.4 miles of alternate Segment P the right-of-way would be widened by 90 feet. This portion of the alternate segment would cross 10.0 miles of agricultural land, 1.3 miles of woodland, 1.0 mile of wooded wetland and 0.1 mile of wetland. Projected land use for this portion of the alternate segment is the same as the existing land use.

Along the easternmost 17.0 miles of alternate Segment P the right-of-way would be widened by 80 feet. This portion of the alternate segment would cross 9.1 miles of agricultural land, border between agricultural land/woodland for 0.9 mile, cross 5.3 miles of woodlands, 0.8 mile of wooded wetland, 0.1 mile of wetland, 0.6 mile of open unused land which could also be wetland and 0.2 mile of a gravel pit operation. Projected land use for this portion of the alternate segment is the same as existing land use.

NRC QUESTION 67 (NRC Letter dated July 10, 1979)

Indicate current land use of acreages utilized for the construction of proposed new and expanded transmission system substations (ER Section S.3.9.2).

RESPONSE

Land use for the various substation sites described in ER Section S.3.9.2 are as follows:

Proposed Substation	New Acreage Requirements	Land Use
Construction Power Substation	1 acre	Agriculture
Haven Nuclear Plant	9 acres	Agriculture
Erdman Substation	-0-	NA
Cedarsauk Substation -		
Saukville Switching Station	0.5 acres	Agriculture
Range Line Substation	4.0 acres	Industrial
St. Lawrence Substation	5.0 acres	Agriculture
Forest Junction Switching Substation	5.0 acres	Agriculture
Alternate Substation		
South Fond du Lac Substation	-0-	NA

Proposed land use is the same as existing land use at all substation sites.

NA - not applicable.

NRC QUESTION 68 (NRC Letter dated July 10, 1979)

Confirm, if possible, the selection of the proposed 73.45-acre borrow site referred to in Section 4.1.1.8 of the ER as a source of earth materials to be used for backfilling at the Haven site. Also confirm the volume of materials to be borrowed and the acreages of the various land use types to be affected. Discuss projected land use for portions of the 73-acre site that will not be affected by excavation of borrow materials.

RESPONSE

The present borrow area, land use and impacts of borrow area activities are described in Section 4.1.1.8 of the Environmental Report. As stated in Section 4.1.1.8, the borrow area described is proposed for use, although alternate borrow sources will also be investigated. The volumes provided in Section 4.1.1.8 are the best estimates of material to be borrowed. Projected land use for areas not affected by excavation activities is expected to remain the same as present use.

NRC QUESTION 69 (NRC Letter dated July 10, 1979)

Provide average pumpage (gpm) data, if available, for each of the non-residential wells listed in Table 2.2-15.

RESPONSE

Average pumping rate data for these 45 wells are not available. In any event, the construction dewatering analysis presented in Section S.4.1.1.6 shows that drawdown effects, if any, on these wells will be negligible.

NRC QUESTION 70 (NRC Letter dated July 10, 1979)

"Applicant's Responses to the Department of Natural Resources - Specific Comments on Amendment 10, DNR Comment 3.6-2, Para. 1, 8/30/78.

The DNR comment from the above reference is as follows: "The calculations used to determine that the filter backwash from the gravity and carbon filters would contain 66 lbs. of solids should be provided ..."

The applicant's response to the above DNR comment stated that "daily solids production due to filter backwash operation was revised to 30 lbs/day to reflect the updated analyses of Haven site water quality data. This estimate is based upon the maximum hydraulic capacity of the system (550 gpm) ... Over a 5-year period, the total solid accumulation would be approximately 18,500 lbs. (3700 lbs/yr)."

In Amendment 14, Section 3.6-2, it is stated that approximately 1850 lbs per year (~5 lbs/day) of suspended solids will be removed from the raw water. Since the hydraulic capacity of the proposed plant has not changed, account for these discrepancies in daily solids production values. (ER Amendment 14, 53.6-2)

RESPONSE

The value of 30 lbs/day is based upon the maximum hydraulic capacity in order to provide an estimate of maximum daily production. The annual values for solids production are based upon average water requirements.

While the maximum hydraulic capacity of the makeup water treatment plant has not changed, the makeup water requirements for one unit are only half those for two units. Thus, the solids filtered from Lake Michigan water used for this purpose have been reduced by a factor of two (from 3700 to 1850 lbs/year).

The response to the Department of Natural Resources comment was based upon two units. Amendment 14, Section S.3.6.2, provides information for a single unit.

NRC QUESTION 71 (NRC Letter dated July 10, 1979)

It is stated in Section 3.6.1.1 that 27,600 pounds of 93% H_2SO_4 will be added per day to the makeup water. In Table S3.6-5, it is listed that 4,789,200 (4684400 = Makeup water treatment system; 104-800 = demineralized water makeup treatment system) pounds of 93% H_2SO_4 will be added per year. This would imply a plant operation figure of 46.5% since:

$$\frac{27{,}600 \text{ lbs}}{\text{day}} \times \frac{356 \text{ days}}{\text{year}} \times .465 = 4{,}684{,}400 \text{ lbs/yr}$$

An average nuclear power plant operates somewhere between 60 and 80% of the year. Explain what appears to be an extremely low plant operating value. (ER Vol. #3, Section 3.6.1.1, pg. 3.6-1 vs. Amendment 14, Table S3.6-5).

RESPONSE

Section 3.6.1.1 of the Environmental Report (ER) provides values for two units, while Table S.3.6-5 of the Single Unit Supplement provides values for a single unit. The latter values should be used. In any event, it is invalid to calculate plant capacity factor based upon chemical use.

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NRC QUESTION 72 (NRC Letter dated July 10, 1979)

Explain how the values in the column entitled "Estimated increase in cooling system blowdown concentration" from Table 3.6-6 were determined. A sample calculation would be helpful. Also, provide the relationship (again, a sample calculation would be helpful) between the 2 columns in Table 5.4-2 entitled "Discharge Mean" and "Ambient Mean". Would not the "Ambient Mean" values simply be multiplied by the plant concentration factor (for those chemical constituents not artificially added to the system) in order to obtain the "discharge mean" values? (ER Vol. #3, Table 3.6-6 and 5.4-2)

RESPONSE

Table S.3.6-5 should be used rather than Table 3.6-6 since Table S.3.6-5 provides values for a single unit.

As a sample calculation, the annual addition of ammonia from Table S.3.6-5 is 562 pounds. The average concentration is calculated as follows:

Average plant discharge (Figure S.3.3-1) = 7792 gal/min.

$$\text{Average concentration} = \frac{562 \text{ lb/yr}}{365 \text{ days/hr}} \times \frac{1}{7792 \text{ gal/min}} \times \frac{1}{1440 \text{ min/day}} \times \frac{1}{8.3 \text{ lb/gal}} \times 10^6$$

$$= 0.017 \text{ ppm}$$

Similarly, the maximum concentration is calculated as follows:

Minimum plant discharge (Figure S.3.3-1) = 5102 gal/min

$$\text{Maximum concentration} = \frac{562 \text{ lb/yr}}{365 \text{ days/yr}} \times \frac{1}{5102 \text{ gal/min}} \times \frac{1}{1440 \text{ min/yr}} \times \frac{1}{8.3 \text{ lb/gal}} \times 10^6$$

$$= 0.025 \text{ ppm}$$

The discharge concentrations provided in Table 5.4-2 are calculated using the formula provided and described in Section 3.6.2. As shown by the formula and the water use diagram (Figure S.3.3-1), the discharge stream is made up of

several individual waste streams of which the cooling tower blowdown is only one. Thus, discharge concentrations cannot be determined simply by multiplying ambient values by the cooling tower concentration factor. The calculated concentrations must be obtained from the mass balance described by the formula in Section 3.6.2.

NRC QUESTION 73 (NRC Letter dated July 10, 1979)

Describe the current status of the WPDES permit?

RESPONSE

The Applicants submitted the WPDES permit application to the Wisconsin Department of Natural Resources (DNR) on September 19, 1978. No response has been received from the DNR as yet.

NRC QUESTION 74 (NRC Letter dated July 10, 1979)

Amendment 14 follows No. 13 (once-through cooling), but the cooling system described in Section 3.4 is for one natural-draft cooling tower. Explain the contradiction.

RESPONSE

There is no contradiction. As stated in the introduction to the Single Unit Supplement (Amendment 14), the Supplement provides information for a single unit with closed cycle cooling and supplements information in Sections 1 through 13 of the Environmental Report which describe a two-unit plant with closed-cycle cooling.

As stated in the introduction to Chapter 14 (Amendment 13), Chapter 14 contains information for a single unit with once-through cooling.

NRC QUESTION 75 (NRC Letter dated July 10, 1979)

Amendment 14 does not provide revised information on cooling tower impacts (plume rise, plume length, drift, fogging, blowdown, etc.) for single unit operation. Justify the implied prediction that cooling tower impacts are the same for one unit as for two.

RESPONSE

The cooling tower impacts (visible plume, drift, fogging, icing and blowdown) from a single unit operation with a single natural draft cooling tower are less than the impacts from a two unit operation with two natural draft cooling towers. This is due to the reduction of cooling water flow and consequently, the reduction of total cooling tower emissions and blowdown. Since the impacts from a two unit operation are insignificant, as shown in Section 5.1.5, a re-analysis of cooling tower impacts for a single unit is unnecessary.

NRC QUESTION 76 (NRC Letter dated July 10, 1979)

Provide drift drop size spectrum data.

RESPONSE

Drop size spectrum data are provided in Figure 3.6-6 of the Environmental Report. The source and use of these data are described in Section 3.6.3.1.

NRC QUESTION 77 (NRC Letter dated July 10, 1979)

Provide the design curves (cold and hot water temperatures, exit air temperature and velocity) as a function of wet-bulb temperatures and humidity.

RESPONSE

Performance curves (cold water temperature as a function of wet bulb temperature and humidity) are provided on Figure 3.4-6. Exit air temperature and velocity for normal and extreme conditions are provided in Tables S.3.4-2 and S.3.4-3.

As stated in Section 3.4.1, the range of the cooling tower is 26F.

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NRC QUESTION 78 (NRC Letter dated July 10, 1979)

Provide a more detailed description of fish egg sampling. The description given for the sampling in the interim study (Appendix K) indicate that only the bottom sediments and water from an unspecified depth over the sediments was collected, yet the entrainment calculation is based entirely on density of eggs in the water column. (Section 14.5.1.3)

RESPONSE

All Lake Michigan species which utilize the near shore zone for spawning deposit eggs on or near the bottom. Alewife eggs are pelagic for only a short time after which they too settle to the bottom. The hose used for egg sampling drew water from the bottom sediment-water interface. These volumes of sediment-water mixture were measured and the density of eggs was then determined by using these volumes and actual egg counts. Although these density values are conservative since they were extrapolated to approximate densities in the entire water column, they were deemed the most appropriate for entrainment loss estimation since the intake would be withdrawing water from the entire water column including the area on the bottom near the structure.

NRC QUESTION 79 (NRC Letter dated July 10, 1979)

Provide an entrainment estimate following a procedure similar to the impingement calculation method, i.e., based on Point Beach data. How does this estimate compare to the original estimate? (Section 14.5.1.3.1)

RESPONSE

The comparative data are listed below. Using this approach, larval fish entrainment estimates derived using field data are very conservative in that they are higher than estimates based on actual operational data. Based on Point Beach Plant operational conditions, actual losses may be lower by a factor of ten. Estimated alewife egg entrainment losses would also be lower using actual field data. The difference between the two estimating techniques is primarily due to the fact that alewife egg densities in the vicinity of the Point Beach intake were, on occasion, hundreds of times higher than in the area of the proposed Haven Nuclear Plant intake.

Species	Point Beach[1] (1975-76)	Haven[2] (Based on Point Beach	Haven[3] (Based on Field Data)
Alewife	4,661,410	2,176,900	1,500,000
Smelt egg	0	0	0
Alewife larvae	416,311	194,400	969,000
Smelt larvae	1,272,080	594,100	5,360,000

1 Source: Wisconsin Electric Power Company 1976 - Point Beach Nuclear Plant Final Report on Intake Monitoring Studies, Report to Wisconsin Department of Natural Resources

2 Assumes maximum flow conditions for both plants where Haven flow equals 0.46 Point Beach flow.

3 Values from Section 14.5.1.3.1

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NRC QUESTION 80 (NRC Letter dated July 10, 1979)

Provide impingement and entrainment estimates for each of the alternate cooling systems and intake designs. (Section 14.5.1.3.1)

RESPONSE

Entrainment Estimates

None of the alternatives (velocity cap, velocity cap plus removable screens, velocity cap with water jet curtain, 10-mm slot wedge-wire screens) would significantly reduce entrainment with the possible exception of the velocity cap with water jet curtain alternative. No operational information is known to exist for predicting entrainment losses with this arrangement. Most of the laboratory research has focused upon the use of this method to reduce impingement losses (see Section 14.10.2.3.3 for a more complete discussion). Recent research has shown that slot sizes greater than 2 mm allow substantial numbers of larval fish to pass through the wedge-wire screen units.

Impingement Estimates

The wedge-wire screen option would effectively eliminate impingement of adult and juvenile fish. The velocity cap with water jet curtain could potentially reduce adult and juvenile fish impingement based on laboratory tests; however, the reduction cannot be estimated due to lack of operational experience (see Section 14.10.2.3.3 for a more complete discussion).

The following table presents a comparison of the velocity cap with and without screens. Impingement of alewife, smelt and longnose dace would not be significantly reduced by the placement of one by two inch mesh screens around the structure for the period March through November (screens would be removed during the winter to prevent ice blockage). Impingement losses of lake whitefish, brown trout, lake trout, coho salmon and white sucker would be substantially reduced. However, loss estimates for the velocity cap without the removable screens option were already extremely low.

Once-through Cooling System Impingement Estimates of Critical Aquatic Organisms for Haven Nuclear Plant

Species	Velocity Cap* Number	Velocity Cap & Screens** Number
Alewife	413,946	413,946
Rainbow smelt	75,369	75,369
Lake whitefish	10	1
Brown trout	37	14
Lake trout	95	2
Coho salmon	8	4
White sucker	50	4
Longnose dace	56	56

* Values derived from Point Beach intake study data (1975-76) and corrected for flow differences, e.g., Haven Plant flow = 46.7% Point Beach flow.

** Values for brown trout, lake whitefish, lake trout, coho salmon and white sucker reduced using relative abundance age (size) data from five year study at Point Beach.