FROM:
Wisconsin Public Service Corporation
Green Bay, Wisconsin 54305
K.W. James

DATE OF DOCUMENT: Oct. 11, 1971
DATE RECEIVED: Oct 12, 1971
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LTR. X MEMO: REPORT: OTHER:
notarized 10-8-71

TO:
Mr. Herold L. Price

ORIG.: CC: OTHER:
3 signed & 50 conf'd

ACTION NECESSARY ☐ CONCURRENCE ☐ DATE ANSWERED:
NO ACTION NECESSARY ☐ COMMENT ☐ BY:

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ENCLOSURES:
Statement Showing Cause Why The Const. Permit For The Kewaunee Nuclear Power Plant Should Not Be Suspended In Whole Or In Part Pending Completion Of The NEPA Enviro Review.....

(50 cys encl rec'd)

REMARKS:

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WISCONSIN PUBLIC SERVICE CORPORATION

P.O. Box 1200, Green Bay, Wisconsin 54305

October 11, 1971

Regulatory File Cy.

Mr. Harold L. Price
Director of Regulation
U.S. Atomic Energy Commission
Washington, D.C. 20545

AEC Docket 50-305

Dear Mr. Price:

Subject: Statement Supporting the Reasons Why the Construction Permit for the Kewaunee Nuclear Power Plant Should Not Be Suspended in Whole or in Part

In reply to your letter of September 24, 1971, and pursuant to Section E of Appendix D, 10 CFR 50, Implementation of the National Environmental Policy Act of 1969, as published in the Federal Register September 9, 1971, we submit fifty (50) copies of a statement supporting the reasons why the construction permit for Kewaunee Plant should not be suspended in whole or in part.

Very truly yours,

E. W. James, Senior Vice-President
Power Generation & Engineering

EWJ:sna

Enc.

Subscribed and Sworn
to me this 5th day
of October 1971

Notary Public
My Commission Expires
Nov. 21, 1971

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STATEMENT SHOWING CAUSE WHY THE CONSTRUCTION PERMIT FOR THE KEWAUNEE NUCLEAR POWER PLANT SHOULD NOT BE SUSPENDED, IN WHOLE OR IN PART, PENDING COMPLETION OF THE NEPA ENVIRONMENTAL REVIEW

This statement is submitted in compliance with revised regulations set forth in Appendix D, 10 CFR, Part 50 as amended and published in the Federal Register September 9, 1971. These regulations were established as the result of the U. S. Court of Appeals decision of July 23, 1971, in the Calvert Cliffs Coordinating Committee, Inc., et. al. versus United States Atomic Energy Commission, et. al., Nos. 24,839 and 24,871.

Appendix D is divided into five sections, A through E. Those sections applicable to the Kewaunee Nuclear Power Plant are Sections C and E. Section C deals with "the procedures applicable to construction permits for the specified facilities issued prior to January 1, 1970, for which operating licenses have not been issued" and Section E outlines "the factors which will be considered by the Commission in determining whether to suspend, pending the required NEPA environmental review, permits or licenses of the specified types issued during the period from January 1, 1970, and the effective date of this revision and construction permits for the specified facilities issued to January 1, 1970, for which operating licenses have not been issued."

The Kewaunee Nuclear Generating Station is jointly owned by three Wisconsin utilities - Wisconsin Power and Light Company (WPL), Wisconsin Public Service Corporation (WPS), and Madison Gas and Electric Company (MGE), hereinafter designated the Owners. Ownership is in accordance with the Joint Power Supply Agreement signed by the three companies on 2 February, 1967, which established a power pool among the participants (Ref. 1) that is known as the Wisconsin Power Pool.

The Owners applied on August 18, 1967, to the U. S. Atomic Energy Commission for licenses to construct and operate the Kewaunee Nuclear Power Plant on a site in the Town of Carlton, Kewaunee County, Wisconsin. The construction permit was granted August 6, 1968, and an application for an operating license has been submitted. The Environmental Report entitled "Environmental Report - Operating License Stage" was submitted in January 1971 and amended June 1971. A supplement to that report, covering the matters described in Section A.1-4 of revised Appendix D to the extent not previously covered, will be submitted pursuant to Section C of Appendix D in lieu of a new Environmental Report in accordance with the stated time schedule. In the meantime, this statement is being submitted to comply with the stipulations in Section E to show good cause, with supporting factual submission, why the construction permit should not be suspended, in whole or in part, pending completion of the NEPA environmental review specified in Section C. All construction and hot functional testing should be completed by June 1972 and the station will be awaiting a permit to load fuel. Commercial operation is scheduled for December 1972. This statement covers the period up to the time of fuel loading.

For convenience sake and in the interest of brevity, certain data will be cited in bibliographical form rather than presenting it with this statement. The format for the statement will conform as closely as possible to the items listed in revised Appendix D, Section E, Paragraph 2 as follows:

(a) Whether it is likely that continued construction or operation during the prospective review period will give rise to a significant adverse impact on the environment; the nature and extent of such impact,

if any; and whether redress of any such adverse environmental impact can reasonably be effected should modification, suspension, or termination of the permit or license result from the ongoing NEPA environmental review.

(b) Whether continued construction or operation during the prospective review period would foreclose subsequent adoption of alternatives in facility design or operation of the type that could result from the ongoing NEPA environmental review.

(c) The effect of delay in facility construction or operation upon the public interest. Of primary importance under this criterion are the power needs to be served by the facility; the availability of alternate sources, if any, to meet those needs on a timely basis; and delay costs to the licensee and to consumers.

ENVIRONMENTAL IMPACT OF CONTINUED PLANT CONSTRUCTION

General. Continued construction activities will be confined primarily to the interior of existing structures and will, therefore, have no significant impact on the environment.

The overall project is 65-70 percent complete. The major activities to be completed are (1) reactor coolant cold hydro - February 1972; (2) hot functional tests start (construction completed) - April 1972; (3) fuel loading start - June 1972; and (4) commercial operation - December 1972. Figure 1, Plant Construction Area, 10/1/71, shows the status of construction.

The activities listed in Table 1, Environmentally Important Activities, have been investigated to assess the impact of continued construction. Certain of these activities have been completed and will, therefore, present no new impact on the environment.

TABLE 1

ENVIRONMENTALLY IMPORTANT ACTIVITIES

A. Site Development.

B. Electrical Transmission Lines.

C. Substation Facilities.

D. Construction Testing and Pre-operational Testing.

E. Continued Use of the Sanitary System.

F. Shoreline Management.

G. Circulating Water Intake and Discharge.

In the discussions that follow, the past environmental impact of construction activities listed in Table 1 will be reported where history could aid in understanding possible future effects.

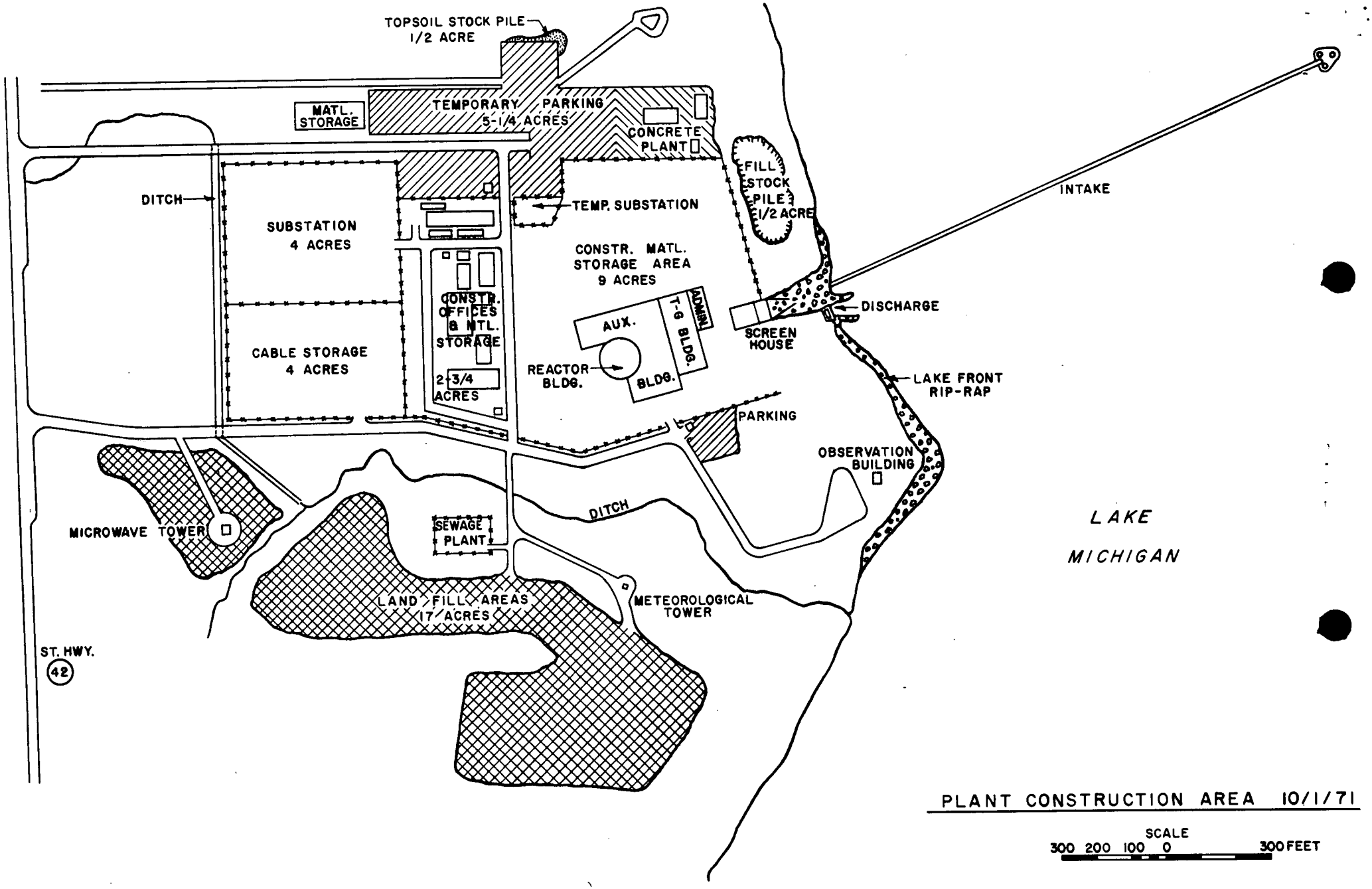
TOPSOIL STOCK PILE
1/2 ACRE
MATL. STORAGE
TEMPORARY PARKING
5-1/4 ACRES
CONCRETE PLANT
FILL STOCK PILE 1/2 ACRE
INTAKE
DITCH
SUBSTATION
4 ACRES
TEMP. SUBSTATION
CONSTR. MATL. STORAGE AREA
9 ACRES
CONSTR. OFFICES & MTL. STORAGE
2-3/4 ACRES
CABLE STORAGE
4 ACRES
AUX.
ADMIN.
T-G BLDG.
REACTOR BLDG.
BLDG.
DISCHARGE
SCREEN HOUSE
LAKE FRONT RIP-RAP
PARKING
OBSERVATION BUILDING
DITCH
MICROWAVE TOWER
SEWAGE PLANT
LAND FILL AREAS
17 ACRES
METEOROLOGICAL TOWER
LAKE
MICHIGAN
ST. HWY.
42
PLANT CONSTRUCTION AREA 10/1/71
SCALE
300 200 100 0 300 FEET

FIGURE 1.

Site Development. The owners purchased 907.57 acres for the Kewaunee plant site. The plant construction area, which is located between State Highway 42 and the shore of Lake Michigan, occupies approximately 110 acres (Figure 1). Of these 110 acres, the major physical facilities occupy approximately 15 acres and the area used to bury construction debris (sanitary land fill) occupies 17 acres. Of the remaining 797 acres, approximately four to five acres are being reserved for proposed high school conservation classes. The rest of the site area is under cultivation and pasture.

All abandoned buildings from the former 12 farmsteads within the site boundary, except three, will be removed within the next three or four months. One of the remaining buildings, a log cabin, will be used as a classroom to teach conservation; and one will be relocated and serve as the Emergency Operations Center. The third building may remain in its present location; however, its use has not yet been determined. With the exception of moving farm buildings, the area outside the immediate plant site will not be altered. The exposed areas occupied by the former farm buildings will be graded, erosion control practices established, and landscaped to blend in with the surrounding area. Consequently, it is expected that disturbance of the wildlife habitat and the landscape will be minimal.

The only significant alterations in land use have already occurred within the 110 acres where the plant is being constructed. These alterations have been the result of grading activities, the construction of structures and facilities, inplacement of sanitary land fill, and the transportation and storage of construction materials and equipment. Very few trees were removed because most of them had been cleared by earlier agricultural operations. No more grading, excavation or clearing is to be done. The only structure remaining to be built is a small garage located in an area presently being used for

temporary construction storage. No more pipelines, ditches, or channels will be dug, with minor exception of the relocation of a portion of a plant entrance road. Relocation will result in an improvement in highway safety.

Erosion control in the construction area has received a great deal of attention by the Owners in cooperation with the Soil Conservation Service (SCS) of Kewaunee County. The SCS was consulted to obtain advise and assistance in planning an optimum soil stabilization program to prevent erosion and to aesthetically enhance the area. Subsurface drainage and erosion control systems such as check dams and grass waterways are being installed. Also, seeding and sodding of grass on exposed slopes is being performed. These activities are progressing as construction progress permits.

The sanitary land fill area will increase by no more than two acres over its present size since production of solid wastes from the construction activities will essentially cease within the next 12 months. Debris is buried approximately six feet below the surface. In addition to construction debris, the area has also received excavation material from the plant building area and dredging material from the lake. This material has been placed in gullies that were formed through natural erosion and soil forming processes. As each section of the land area is filled, it is graded to improve natural drainage and then planted to grasses for soil erosion control and aesthetic improvement.

If construction is discontinued in the immediate future, many of these soil stabilization operations would not be completed. Hence, the construction site would be susceptible to erosion and could sustain damage if it were left unattended. Also, if construction were delayed, it would be necessary to construct additional temporary buildings to store construction equipment. Construction of these buildings would also increase the erosion hazard since additional land excavation would be necessary.

Electrical Transmission Lines. All construction of transmission lines serving the plant has been completed and, consequently, no additional environmental impact will occur. No access roads were constructed along the rights-of-way, and towers were designed to effect as pleasing an appearance as possible.

Substation Facilities. Construction of the substation has been completed on approximately 8.0 acres of the 110 acre construction site. Not only will it serve the proposed nuclear plant, but it is a necessary component of the present power transmission system. Even if Kewaunee were not operated, the substation would remain.

The substation presents clean, functional lines, a low structural profile, and has a subdued color. Landscaping of the area will be completed within the next 12 months and will further improve the substation's appearance.

Construction Testing and Pre-operational Testing. During the next 12 months, effluent process systems will be completed and effluents from pre-operational testing will be discharged. These will include the rinsing waters from the demineralizer system, which will be trucked away during the first charging. Later regeneration rinsings will be neutralized to a pH of approximately 7 and then released to the circulating water discharge system for dilution. The primary system stainless steel flush water, which is demineralized water, will be discharged through cloth strainers to the lake. An alkaline rinse consisting of 1,000,000 lbs. of 1% sodium metasilicate penta hydrate will be neutralized to a pH of 7 and released to the circulating water discharge system for dilution.

Hydrazine (1 to 1.5 ppm) used in wet lay-up of the steam generator will be diluted further and released to the lake. No use of hypochloride is planned during this testing period.

The potable water system softener regenerants will release 2,500 gallons of 10% salt solution every two days to the circulating water discharge system for further dilution. A small amount of water from a one-time waste evaporator test containing very small amounts of borate and laundry solution will also be released to the lake.

A permit for these discharges is presently being requested from the U. S. Army Corps of Engineers. These discharges are within the limits of the operating permit granted by the Wisconsin Department of Natural Resources (Ref. 2). It is not anticipated that these concentrations will have a discernible impact on the water quality or biota of Lake Michigan. Nevertheless, a program has been established to monitor water chemistry and to survey fish, bottom fauna and plankton in the area on a continuing basis to determine effects of operations at the site.

Continued Use of Sanitary System. The sanitary system involves a secondary sewage treatment facility to handle non-radioactive wastes from lavatories, janitor's sinks, and normal sanitary collections. This system has been in operation for approximately three years, and is operated under the jurisdiction of the state-licensed employees of the company and its construction engineering consultant. The present system removes 85-95% of organic materials, keeps phosphate concentrations to 5 mg/l or less, neutralizes the pH, and provides for chlorination at twice the recommended time suggested by state regulations to reduce the bacteria count. The Wisconsin Department of Natural Resources approved the operation of this facility in 1969 and again in a letter dated August 2, 1971.

Based on water quality and biological samples and observations to date, no discernible adverse effects have been indicated from the results of

construction and past effluent discharge from the sanitary system and no adverse effect is anticipated from operations during the review period. Although all proposed effluent discharges have been approved by state and local agencies and there are no indications of an impact on the aquatic life from past or continued construction and operation, the ongoing water quality and biological monitoring programs will be continued.

Shoreline Management. No additional disturbance in the shore and environs will occur. Rock riprap was placed along 1,125 feet of shoreline to a depth of approximately nine feet below the waterline and has been completed. Rapid recession of the shoreline, several feet per year, was a feature of the coast prior to installation of the riprap. The riprap should result in a more stable environment and may enhance the proliferation of biota.

Circulating Water Intake and Discharge. Installation of this system has been completed and, therefore, additional environmental impact will not be experienced. Disturbance of the environment occurred when the channel for the circulating water system was dredged. Installation of the intake system required that 6,950 cubic yards of bottom material be dredged from the lake. If construction is halted, wave action from Lake Michigan would deposit silt in the discharge structure, requiring the system to be dredged a second time when the plant is approved for operation.

EFFECT OF CONTINUED PLANT CONSTRUCTION ON THE ABILITY TO ADOPT ALTERNATIVES IN FACILITY DESIGN

Continued plant construction during the review period will not prevent adoption of alternatives in facility design of the type relevant to the ongoing NEPA environmental review.

There are several reasons for this conclusion, namely: (1) an awareness on the part of the Owners of the possible alternatives in facility design which could be requested; (2) a demonstrated willingness to perform feasibility studies and cost estimates related to these alternatives in addition to actually making structural provisions for adaptation of possible alternatives in the future; (3) a high percentage of completion of facility structures and systems; and (4) a high level of committed costs, require that the Owners adopt reasonable alternatives in design in the interest of protecting the environment.

As indicated in (1) and (2) above, the Owners have exhibited an awareness of possible alternative requirements in facility design and a willingness to perform timely studies with respect to those alternatives. For example, they authorized their architect-engineer (Pioneer Service and Engineering - PS&E) to make comparative feasibility studies and cost estimates of various alternative methods of waste heat disposal. The Owners felt that such studies were necessary to be responsive to the review by regulatory agencies of water quality standards. These studies examined four different mechanical draft cooling tower schemes in addition to other systems, namely, cooling or spray ponds and natural draft cooling towers. The important considerations in the comparison of alternative systems were economics, functional desirability, and environmental impact.

A prime effect of these studies was to enable the Owners to assure themselves that continued construction of the facility would not unduly hamper later adoption of alternative waste heat disposal systems should such systems become necessary if the present system is shown to cause environmental damage. In addition, the Owners have considered secondary interactions of such alternatives with the existing facility design. For example, adoption of cooling towers at a later time due to changing environmental regulations would have a secondary effect upon the Radioactive Waste Disposal System. PS&E has addressed itself to this consideration and is developing designs which can interact present plans with possible future requirements.

The high percentage of completion for facility structures and systems as noted in (3) above has an important relation to the ability to adopt alternatives. Many of the systems or structures which are important from an environmental standpoint are at or very near completion, as shown in Table 2, Environmentally-Important Systems, Committed Capital, and Construction Status. For those systems, continued construction during the review period will not foreclose on the ability to adopt alternatives since relatively little additional commitment will be made. Most of the investment would be lost even if construction were halted. Therefore, delaying construction would not make the adoption of alternatives easier or less expensive than would be the case after the projected review period.

The only major system which is not essentially complete is the Radwaste System. Although, as shown on Table 2, only about 20 percent of construction is complete, more than 75 percent of the cost of the system has been committed. The radioactive waste system has been designed in response to developing technical knowledge. The System incorporates the latest techniques in radioactivity control, so it is unlikely that advances in the next 12

TABLE 2

ENVIRONMENTALLY-IMPORTANT SYSTEMS

COMMITTED CAPITAL AND CONSTRUCTION STATUS

System or Structure	1 Oct. 71 Est. Percent Construction Completion	Estimated 100% Completion Date	Estimated Total System Cost	Cost to be Committed (Remaining Materials and Constr. Labor)
Circulating Water Intake and Discharge	100	----	$3 525 000	---
Sanitary Sewage	100	----	40 000	---
Transmission Lines	100	----	360 000	---
Substation	100	----	5 400 000	---
Containment Vessel	100	----	2 480 000	---
Heating System (incl. boiler)	75	12/71	350 000	25 000
Plant Structures				
Shield Building	95	1/72	1 300 000	$100 000
Auxiliary Building	95	1/72	Breakdown Not Readily Available	
Turbine-Generator Building	98	1/72	" " " "	
Administration Building	95	12/71	" " " "	
Demineralizers and Makeup Water	90	11/71	450 000	30 000
Rad-waste	20	1/72	800 000	170 000
Reactor Building Internal Concrete	85	2/72	950 000	75 000
Ventilation	*	**	Breakdown Not Readily Available	

*20-80 percent complete, depending on particular ventilation system.
**In range of December 1971 to March 1972.

months will require changes. However, the size, shielding, and layout of the system allows for additional equipment to be added at any time, even after extended full power operation.

The advanced components in the present Radwaste System include the use of both evaporation and ion exchange. Three complete interconnected systems are used for processing liquid wastes: the radioactive waste system has a holdup tank, filter, evaporator, demineralizer, and waste condensate tank where the effluent is monitored before discharge; low radioactive liquid wastes go to a holding tank, ion exchanger, filters, and evaporator, then are recycled as reactor makeup water; the steam generator and plant heater blowdown system has holdup tanks, ion exchangers, and monitor tanks.

Each liquid waste system has provisions for recycling the effluent to achieve design concentrations. Interconnections make loops available for treating other streams as needed; for example, in case of higher than normal flow, transient high flow rates are handled by holding tanks which allow each stream to be processed at the design rate.

Radioactive gas waste is held a minimum of 45 days for reduction of radioactivity. Gas released from the holdup tanks is reduced by recovering N_2 and H_2 and returning them to the system. Releases from the gaseous radwaste system are expected to result in an addition of only 0.003 mr/year to a 125 mr/year background activity count.

The Owners believe the existing Radwaste Systems meets the "as low as practical" requirement of the AEC. The System has been continually updated and revised. In any event, continued construction of the system would not foreclose on the ability to incorporate new and proven improvements since such

foreseeable improvements would be in the form of add-on equipment and the Owners have demonstrated a willingness to incorporate such improvements.

A final reason, as noted in (4) above, why continued plant construction would not foreclose subsequent adoption of reasonable environmental protection alternatives is related to economics. Total cost of the Kewaunee project, including first core fuel, will approach 160-million dollars, of which 132-million has been committed as of October 1971. This financial commitment on the part of the Owners in the interest of the public which they serve would have to be maintained in the event of changing environmental regulations, which may require additional expenditures beyond that described above.

THE EFFECT OF DELAY IN FACILITY CONSTRUCTION OR OPERATION UPON THE PUBLIC INTEREST

The effect of delay of construction of the Kewaunee Nuclear Power Plant will have a significant impact on the public interest. Several factors are involved in this impact and are discussed below.

The need for power to be produced by the Kewaunee Nuclear Power Plant is evident from a review of the Wisconsin Power Pool capacity-demand figures. These are shown in Table 3, Wisconsin Power Pool Capacity-Demand Estimates, without Kewaunee Nuclear Power Plant 1972-1973.

The combined demand estimates in Table 3 forecast demands of 1944 MW in the 1972-73 winter and 2147 MW in the 1973 summer. These are based upon the latest actual experience which have shown maximum demands of 1670 MW in the 1970-71 winter and 1850 MW in the 1971 summer. The rate of increase forecasted is conservative when compared to the average rate of increase experienced during the last ten years of 8.0 percent in summer demand and 6.9 percent in winter demand.

The required reserve capacity for the Wisconsin Power Pool is related to the status of its owned generation and transmission facilities, its interconnection capacity with neighboring utilities, and the status of generation and transmission facilities on neighboring systems. For interpool reliability purposes, the Wisconsin Power Pool, as a member of the Wisconsin-Upper Michigan Systems, coordinates its principal external capacity transactions through the Mid-America Interpool Network (MAIN). The MAIN Capacity-Demand Estimates with Nuclear Generating Plant Delay, 1972-1973, are shown in Table 4.

The Wisconsin Power Pool has attempted to maintain a minimum reserve percentage of 15 percent of its maximum demand. During the last several years

TABLE 3

WISCONSIN POWER POOL

CAPACITY-DEMAND ESTIMATES WITHOUT
KEWAUNEE NUCLEAR POWER PLANT

1972-1973

	Megawatts	
	Winter	Summer
Capability	1972-1973	1973
WPS	799	778
WPL	932	907
MGE	259	245
Total	1990	1930
Demand		
WPS	762	803
WPL	900	970
MGE	282	374
Total	1944	2147
Less MGE Purchase	-75	-75
Total Adjusted Demand	1869	2072
Margin	121	(-)142
% Reserve	6.5%	---
Pool Purchase	120	---
Margin with Purchase	241	---
% Reserve with Purchase	13.8%	---

this has not always been possible. Reserves have been as low as 9.0 percent in 1969 and 10.2 percent in 1970. During these periods the Wisconsin Power Pool has had to rely on other MAIN members for assistance on numerous occasions. The difficulties in obtaining such assistance have verified the necessity of maintaining a minimum of 15 percent reserve in the Wisconsin Power Pool.

The MAIN organization has not yet adopted a minimum reserve policy for itself or for its members. However, a MAIN report (Ref. 3) has been prepared specifically to analyze generating capacity reserves and transmission limitations. Discussion contained in this report indicates that a minimum reserve that could be considered feasible for the MAIN organization would be 15 percent. This is verified by the continuing discussion of 20 percent being an adequate reserve by the Federal Power Commission (FPC) (Ref. 3).

The Wisconsin Power Pool reserve during the winter 1972-73 without Kewaunee is estimated to be 13.8 percent (Table 3). Since this will be less than the required minimum, assistance from MAIN will be required. The MAIN organization reserve during this period is estimated to be 38.7 percent (Table 4). It appears, therefore, that the necessary assistance may be available, provided that nuclear plants such as Point Beach #1 (WE) and Dresden #3 (CE) are in operation.

During the summer, 1973, the Wisconsin Power Pool will have no reserve, and in fact a deficiency of 142 MW (Table 3) will result from supplying its own load. The MAIN organization total reserve will be at or below minimum requirements, even with all nuclear plants other than Kewaunee (WPS) and Zion #1 and #2 (CE) operating. Based upon the MAIN Report, it must be concluded that the Wisconsin Power Pool cannot rely upon the MAIN organization to provide the necessary assistance during the summer, 1973. The MAIN Report also indicates that similar

TABLE 4

MID-AMERICA INTERPOOL NETWORK (MAIN)

CAPACITY-DEMAND ESTIMATES WITH
NUCLEAR GENERATING PLANT DELAY

1972-1973

	Megawatts	
Capability	Winter 1972-1973	Summer 1973
(a) Owned Capability	31 355	32 871
(b) Non-Firm Purchases	1 604	1 788
Adjusted Capability	32 959	34 659
Demand		
(a) Native	22 530	30 526
(b) Firm Sales (Purchases)	1 486	(304)
(c) Interruptible	(239)	(238)
Adjusted Demand	23 777	29 984
Margin	9 182	4 675
% Reserve	38.7%	15.6%
Assumed Nuclear Plant Delay*		
(a) Kewaunee (WPS-WPL-MGE)	527	527
(b) Quad Cities #2 (CE)	809	---
(c) Zion #1 (CE)	1 039	1 089
(d) Zion #2 (CE)	---	1 039
	2 375	2 655

*Assumes one year delay in commercial operation.

Reference - MAIN Report, "Analysis of Demand and Capacity Considering Possible Curtailments of Output from Nuclear Power Plants, 1971-1975", dated October 1, 1971.

situations will exist in other neighboring reliability areas; hence, purchase of capacity from outside the MAIN area cannot be viewed as feasible.

In addition, it must be recognized that the Wisconsin Power Pool has been operating with minimum reserves for several years. This has caused a postponement of equipment maintenance, with resulting increased hazard of forced outages. Although difficult to quantify, this has the effect of demanding an increased minimum reserve until such maintenance can be effected.

It is clear from the foregoing that the need for power from the Kewaunee Nuclear Power Plant is immediate and a significant delay in operation of the plant would result in a high probability of a power shortage in 1973.

The availability of alternate sources of generation on a timely basis is limited to combustion turbine or diesel generators. Fossil-fueled plants and hydroelectric plants have a lead time of five to seven years and could not be constructed in time to meet the systems' increasing demand. Other, more sophisticated means, such as solar generators, are still experimental on a commercial basis. As pointed out previously, the purchase of power does not provide a satisfactory solution to long-term power needs due to the increasing demands on neighboring systems and their lack of excess reserves.

Combustion turbines or diesel generators could be installed in 12 to 18 months. This is short-term capacity and would not replace the capacity available from the Kewaunee Plant. Operations with this type of capacity would not be without significant impact on costs and on the environment. Because of the high cost of natural gas and oil fuels and equipment maintenance, combustion turbines or diesel generators are limited to supplying short-term peak loads. Consequently, the major part of the generation not available from the Kewaunee

Plant would have to be transferred to existing coal-fired generating plants of the Pool companies. This would affect existing plans to modernize air pollution control equipment on these plants. Existing plans, shown in Table 5, Wisconsin Power Pool, Precipitator Installation and Upgrading Schedule, are in response to an Order from the Wisconsin Department of Natural Resources (Ref. 4). Delay of the Kewaunee Plant may force a corresponding delay in all planned modernization changes in 1973 and subsequent years. Clearly, this would result in some additional environmental impact beyond that which would occur if modernization were allowed to progress on schedule.

Although not covered in this discussion, the effects of transferring generation to plants fueled with natural gas, oil, and coal, which are generally considered to be limited resources and are currently in short supply due to mining and transportation limitations, including strikes, should be considered.

The costs of delay to the licensee and consumer should the Kewaunee Nuclear Power Plant not proceed on schedule would be substantial and widespread. They include such costs as construction shutdown and startup, mothballing of equipment, interest during construction, fuel and material storage, the loss of key people, loss of generation, effect on capital, possible rate increases, effects of a power shortage, impact on the local economy and on the personnel laid off, personnel retraining, and the effect of the quality of construction. Some of these costs such as the impact on laid-off personnel and the effect of a power shortage are difficult, if not impossible, to quantify. Others are more quantifiable and are discussed in succeeding paragraphs.

The total estimated cost, including the first core fuel of the Kewaunee Nuclear Power Plant, is approximately 160-million dollars, of which approximately

TABLE 5

WISCONSIN POWER POOL

PRECIPITATOR INSTALLATION AND UPGRADING SCHEDULE*

Generating Unit	Capacity MW	Planned Installation	Present Schedule
Wisconsin Public Service Corporation			
Pulliam Unit #3	27.3	Precipitator Upgrading	9/73
Pulliam Unit #4	27.2	" "	3/73
Pulliam Unit #5	46.9	" "	4/74
Pulliam Unit #6	64.8	" "	4/75
Pulliam Unit #8	130.3	" "	11/74
Wisconsin Power & Light Company			
Edgewater Unit #3	72.7	New Precipitator	10/72
Nelson Dewey Unit #1	109.3	" "	11/73
Nelson Dewey Unit #2	104.6	" "	5/74
Madison Gas & Electric Company			
Blount St. Boiler #5	15.0	Oil/Gas Conversion	3/73
Blount St. Boiler #6	15.0	" "	3/73
Blount St. Boiler #8	47.2	New Precipitator	4/73
Blount St. Boiler #9	48.0	New Precipitator	4/73

*These additions are scheduled to comply with air quality requirements of Section NR-154.05 of the Wisconsin Administrative Code.

132-million dollars have been committed. Delay in plant construction for 12 months would result in an additional cost of approximately 2-million dollars for such items as contractor fees, equipment demobilization and mobilization, storage and material handling, maintenance, guard service, exercising equipment, etc. (Ref. 5). Also, the cost of interest during construction, interest on nuclear fuel, and storage of nuclear fuel would bring the total to approximately 8-million dollars.

Another cost of delayed construction of Kewaunee is the cost of the resultant delay in operation and the production of power that would have otherwise been produced by the plant during the delay period. This involves the continued or extended operation of less efficient units and the purchase of more power (which may or may not be available). A calculation of this cost for 12 months utilizing the most optimum configuration (i.e., most efficient plants providing the greatest portion of the power) results in a cost of approximately $26,330,000. The cost of operating Kewaunee for the same 12-month period is estimated at $7,980,000. The increased cost of generation, therefore, is $26,330,000 minus $7,980,000, or $18,350,000.

A prolonged delay in completion of the Kewaunee Nuclear Power Plant would result in a total idle investment of $132-million for Wisconsin Public Service Corporation, Wisconsin Power and Light Company, and Madison Gas and Electric Company, the three partners. Each company's share of the idle investment would be over 30% of its total net utility plant in service at the end of 1972. The companies' present rates cannot support this amount of idle capacity. Rate increases would be necessary; however, the Public Service Commission of Wisconsin, which regulates the three companies involved, excludes Construction Work in Progress from the rate base so rates under this policy could not support this substantial idle investment. During the delay, the companies could

receive credit for Interest During Construction at rates below the estimated cost of money to each company at the end of 1972. The Owners are not aware of the Public Service Commission of Wisconsin ever permitting the adoption of Interest During Construction rates equal to the cost of money level. Consequently, earnings of the three companies would be seriously affected by any delay.

Along with the lack of earnings on this idle investment, the companies would also experience the economic loss of the Kewaunee Nuclear Power Plant which would be their cheapest source of energy if it were operating. It would be necessary for each of the three joint companies to use its own most costly generation since all planning anticipated the availability of the Kewaunee Nuclear Plant. It would also be necessary for each of the companies to purchase firm power, when available, from other utilities. This could be difficult in light of the reserve levels. Such purchased power would be expensive since it would come from the less efficient generators of the other utilities. In addition to purchased power, it may be necessary to purchase and construct peaking plants which are more costly to operate. The additional investment in these plants would aggravate the forthcoming heavy financing program for the three companies. Without the need for these peaking plants or additional environmental requirements that are being considered, the companies' construction and financing requirements in the next five years exceed 170% of the prior five years and include seven issues of common stock, five of preferred stock, and fourteen issues of bonds or debentures. With this program ahead of the companies, it is imperative that earnings attain levels which will permit their securities to be attractive in the market.

Each of the factors listed above has an adverse effect on earnings which are presently inadequate. Wisconsin Public Service Corporation has two

rate cases currently pending. The Wisconsin rate case is subject to the price freeze. The Federal Power Commission has suspended proposed new rate schedules until December 1, 1971. This also may be affected by the economic price freeze. In neither case, however, has the delayed schedule of Kewaunee and the associated higher costs been anticipated. Therefore, it would be necessary for each of the three companies to submit rate increase appeals. With the lack of definitive data associated with any delay and the regulatory lag, it would be difficult to receive rate relief to offset the increased costs. The companies already have made seven rate requests in the last three years to offset rising costs. Further increases would be quite substantial to offset the large carrying costs on the idle investment and the more costly sources of energy to satisfy their customers. There could be strong reaction on the part of their customers since there seems to be more concern with each subsequent rate case.

The Wisconsin Power and Light Company's bond indenture excludes non-licensed facilities from bondable property. This Company has difficulty at this point in providing sufficient bondable property for the sale of additional first mortgage bonds.

With the lack of bondable property or insufficient bond interest coverage by the partners involved in this project, the companies would be required to sell debentures rather than first mortgage bonds. These financings could not be deferred. Wisconsin Public Service Corporation's bonds are rated A by Moody's and debentures are nominally rated one grade lower. This would increase its financing costs approximately 40 basis points during the time when earnings are already inadequate. A similar situation would occur for the other companies.

If this project were delayed extensively, it could result in the three companies losing the benefit of the investment tax credit associated with

this project. This would be a loss of over 3-million dollars in income for the three companies.

A full complement of men has been hired and trained for the operation of this nuclear generating plant. These people are of high intelligence and in extremely short supply. During a period of prolonged delay, the Owners would not have productive work for these men since this is their only nuclear plant. These people are remotely located from the other generating plants and the power and engineering staff office. During this delay the Owners could conceivably lose a substantial number of people who have been trained and certified for this specific project. Their loss would be very costly in dollars as well as the time to train and get new people licensed before operation.

Impact on the local economy is difficult to estimate without an extensive analysis of the economy of the area. Perhaps the principal impact would be in terms of payroll dollars lost during the delay. A review of the work force at the site indicates that 544 of 612 persons employed classify as local residents (one to two years residence) of the lakeshore-Fox River valley area. The average yearly payroll to these persons of about 9-million dollars would be lost to the local economy.

In addition to the foregoing losses associated with a delay in construction, a very important area to a nuclear facility should be mentioned; that is the effect on the quality of construction. An extended stoppage of work on plant construction would have a detrimental effect on the Kewaunee Quality Assurance program. Major areas of consideration are the loss of Quality Control personnel for the duration of the stoppage and the storage and maintenance of components and systems as they presently exist.

The Quality Control personnel presently assigned have an average of about one and one-half years experience on the Kewaunee project. This experience includes not only a thorough knowledge of the Quality Assurance program of Wisconsin Public Service, but in addition, each Quality Control Engineer knows the Quality Assurance program of the various contractors they are assigned to follow. This background of the project might never be recovered if it were necessary to train a new group of Quality Control Engineers after an extended work stoppage. In addition to the above, the Quality Control personnel of the various on-site contractors have been trained for the specific program tailored to the Kewaunee Plant. A loss of these personnel would require considerable retraining of new personnel to reach the present level of efficiency. As a consequence of the above conditions, the Quality Control program would undoubtedly experience a decrease in efficiency with respect to present standards, which may have a detrimental effect on the quality of the work during the interim period of retraining.

The present status of construction consists of equipment and materials in storage in various stages of construction and component installation. A work stoppage would require the initiation of a Quality Assurance program for extended storage of components and closing up piping systems, with respect to environmental and cleanliness controls. Certain electrical and mechanical components or systems would have to be stored with dessicant or gas pressure. Electrical motors would require a pre-determined meggering program, pump shafts would require a predetermined rotation sequence, and certain component finishes protected with protective coatings to prevent corrosion. All this work would require a staff of personnel for the implementation of the program, including maintaining of records throughout the shutdown period.

The implementation of the above-described Quality Assurance Program for component and system storage would be a new experience which could result in isolated areas of inadequate Quality Control attention. It is expected that the overall Quality Assurance program would, therefore, be hindered by a work stoppage, which would require an interim Quality Control program for the stoppage duration.

SUMMARY

It can be seen by the foregoing that:

1. Continued construction during the environmental review period will not give rise to a significant adverse impact on the environment.

2. Continued construction during the review period will not foreclose adoption of alternatives in facility design, and

3. A delay in construction will adversely affect the public interest.

Continuing construction will not affect the environment because the remaining activities will be confined primarily to the interior of plant structures. Outside activities will be devoted mainly to landscaping and road surfacing. Some adverse environmental impact in this category may occur if construction is delayed because site cleanup and landscaping operations cannot be completed.

Continued construction during the review period will not foreclose adoption of alternatives in the facility design. Construction of buildings and most systems throughout the plant have been completed. For remaining systems, the cost yet to be committed is of relatively minor significance. Therefore, the additional construction during the review period will not substantially alter committed cost or affect decisions concerning system improvements or replacements.

There will be a significant impact on the public interest if there is a delay in facility construction. The need for power is evident from the

capacity-demand figures of the Wisconsin Power Pool. By the summer of 1973 a deficiency of 142 MW will be experienced on the basis of the companies' projected demands and generating capacity. The ability to purchase power is limited by the availability of power from the Mid-America Interpool Network (MAIN), of which the Wisconsin Power Pool is a member. Projections of MAIN indicate that its reserve will be marginal. Therefore, purchasing power is not a feasible alternative to a delay in operation of Kewaunee. Other sources of base load generation are not available on a timely basis. Combustion turbines or diesel generators could be purchased but are not designed for sustained operations. These units could not supply the base load capability of Kewaunee and much of it would have to be furnished by existing fossil-fired units. This would delay the planned modernization, including installation of air pollution control devices on existing fossil-fired units.

The costs to the licensee would be great. If the plant were delayed for 12 months, the increased cost of operation of other facilities plus costs associated with contractor fees, demobilization and mobilization, interest during construction, etc., are estimated at more than 26-million dollars. Earnings of the companies would be adversely affected. An increase in the cost of money would result, and this, coupled with the difficulty in obtaining rate increases, would put the Owners in an unfavorable financial position.

The costs to the consumer would be great also. In addition to an increase in the cost of electricity, the local economy would suffer due to the loss of payroll dollars. Most important, however, would be the substantial increased risk of a power shortage in 1973.

The environmental cost associated with continued construction of the Kewaunee Nuclear Power Plant is negligible, and a delay in construction would have a substantial adverse effect on the quality of the human environment far beyond its cost.

REFERENCES

1. "Joint Power Supply Agreement Between Wisconsin Power and Light Company, Wisconsin Public Service Corporation, and Madison Gas and Electric Company," February 2, 1967; Docket Nos. CA-7459, 2 WP 2570, Exhibit No. 1.

2. "Wisconsin Department of Natural Resources Discharge Permit #69-363", dated June 5, 1969.

3. "Analysis of Demand and Capacity Considering Possible Curtailment of Output from Nuclear Power Plants, 1971-1975," Mid-America Interpool Network, October 1971.

4. "Wisconsin Department of Natural Resources letter dated October 13, 1970."

5. "Study of Costs of 12 Month Delay in Construction as of September 15, 1971," Pioneer Service and Engineering Company, September 16, 1971.