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DESCRIPTION: Ltr trans the following:

ENCLOSURES: EPA Comments on Enviro Impact Statement for Kewaunee Power Plant....

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PLANT NAMES: Kewaunee Plant

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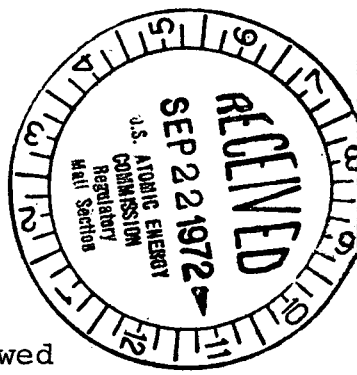

Mr. L. Manning Muntzing
Director of Regulation
U.S. Atomic Energy Commission
Washington, D.C. 20545

Dear Mr. Muntzing:

The Environmental Protection Agency has reviewed the draft environmental statement for the Kewaunee Nuclear Power Plant, and we are pleased to provide our comments.

In our opinion, it may not be possible to operate the Kewaunee plant at full power using the once-through cooling system and avoid significant damage to aquatic biota. We recommend, therefore, that the applicant initiate steps appropriate to assure that the plant facilities and operation will be in accordance with the Lake Michigan Enforcement Conference recommendations and that no significant adverse effect on water quality or aquatic biota will occur.

According to our review of the gaseous effluent control systems provided in the Kewaunee plant, all significant normal gaseous effluent release points are provided with iodine treatment systems. Thus, the iodine releases from Kewaunee should be "as low as practicable." However, the draft statement includes an estimate of 45 millirem/year as a potential thyroid dose to a child. This estimate appears to be excessive and is high because credit was not taken for the capability to treat the condenser steam jet air ejector and blowdown tank vent exhausts. The final statement should provide the criteria for utilizing these effluent treatment systems. Because of the nearby dairies, we encourage the applicant to utilize the available iodine control systems in a manner to minimize releases of radioiodines to the environment.

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The draft statement does not include an assessment of: (1) potential thyroid doses resulting from possible future use of part of the plant property as pasture, (2) potential thyroid dose consequences of atmospheric steam dumping, or (3) the combined environmental impact of radioiodine discharges from the Kewaunee and Point Beach nuclear plants. We believe that these points should be addressed in the final statement, and an evaluation of potential dose consequences to the population should be presented.

We will be pleased to discuss our comments with you or members of your staff.

Sincerely,

Sheldon Meyers

Sheldon Meyers
Director
Office of Federal Activities

Enclosure

EPA#D-AEC-00063-26

ENVIRONMENTAL PROTECTION AGENCY

Washington, D.C. 20460

September 1972

ENVIRONMENTAL IMPACT STATEMENT COMMENTS

Kewaunee Nuclear Power Plant

TABLE OF CONTENTS

INTRODUCTION AND CONCLUSIONS

The Environmental Protection Agency (EPA) has reviewed the draft environmental statement for the Kewaunee Nuclear Power Plant prepared by the U.S. Atomic Energy Commission (AEC) and issued on July 21, 1972. Following are our major conclusions:

1. In order to provide protection for the aquatic environment of Lake Michigan, we suggest that the applicant initiate steps appropriate to assure that the Kewaunee plant facilities and operation will be in accordance with the Lake Michigan Enforcement Conference recommendations and that no significant adverse effect on water quality or aquatic biota will occur.

2. Analysis of available information indicates that it may not be possible for the Kewaunee plant using the once-through cooling system to operate at full power and, at all times, comply with the thermal criteria of 1000 ft - 3°F as specified in the conference report. The final statement should indicate how compliance is to be accomplished.

3. The most significant radiological consequence from normal operation of the Kewaunee Nuclear Power Plant is expected to be the potential thyroid doses from ingestion of ^{131}I via milk. The final statement should provide clarification of: (1) the criteria for use of the iodine control systems, (2) the potential ^{131}I discharges during transients which result in steam dumps to the atmosphere, and (3) the applicant's plans for returning the site property to agricultural use.

4. Liquid radioactive waste management systems may be capable of treating effluents to levels that can be considered "as low as practicable." However, final determination is not possible since the turbine building sources have not been addressed in either the draft statement or the FSAR.

RADIOLOGICAL ASPECTS

Radioactive Waste Management Systems

The radioactive waste management systems provided for the Kewaunee Nuclear Power Plant appear to be representative of present waste treatment technology and industry practices, except for the liquid waste system evaporator, which has a smaller capacity than evaporators at many other pressurized water reactors (PWR's). Nevertheless, it is expected that the Kewaunee effluents can be adequately treated to meet proposed guidelines of Appendix I to 10 CFR Part 50. Furthermore, the releases may be consistent with the philosophy of "as low as practicable" if the waste treatment equipment provided is used in a manner which is consistent with the commitment given in the draft statement: "The releases...will conform to the U.S.A.E.C. requirements that they be 'as low as practicable,' that...if possible, be lower than specified limits, and that the resulting doses to people...will be well within an acceptable range." The final statement should provide the applicant's criteria to implement this commitment.

The Kewaunee ventilation control systems appear capable of maintaining the discharge of ^{131}I to levels consistent with the philosophy of "as low as practicable." Nevertheless, the AEC estimated that 0.59 curies of ^{131}I would be discharged annually - mainly from the condenser steam jet air ejector and the blowdown tank vent. The draft statement also indicates that this discharge of ^{131}I could reslut in thyroid doses which exceed the guidelines of Appendix I. However, in the draft statement the AEC did not give consideration to the extent of iodine control provided by

available plant systems i.e., (1) routing of the blowdown tank vent discharge to the condenser, (2) routing of the condenser air ejector discharge through the Auxiliary Building Special Ventilation System (ABSVS), and (3) treatment of the auxiliary building exhaust by the ABSVS.

The ability to minimize the iodine discharges from Kewaunee is imperative since there are dairy herds very near the plant, and some herds possibly may be allowed on the site property. Therefore, the final statement should: (1) present clarification of the applicant's commitments to use the various means available to minimize discharge of radioiodine, (2) present the applicant's criteria for using the available systems, and (3) provide a discussion of criteria the AEC will use for gaseous effluent limits to assure that "as low as practicable" levels result.

In their evaluation of the expected plant effluents, the AEC did not comment on the applicant's estimate of an annual discharge of 52 curies of ^{131}I from atmospheric steam dumps (Appendix A to the draft statement). Since this estimated source of ^{131}I discharge is two orders of magnitude greater that the ^{131}I release estimated by the AEC in the draft statement and could result in thyroid doses that may exceed Appendix I guidelines, the AEC should discuss the reasons why they did not address steam dumping in the draft statement. We note that the proposed Appendix I to 10 CFR Part 50 and the present regulations (10 CFR Part 50.36a) indicate that "...discharges...during normal reactor operations, including expected operational occurrences..." apply to discharge and dose limits established for the station. The final statement should include: (1) a detailed discussion and evaluation

of this source of iodine discharge, (2) its environmental impact, and (3) a discussion of the relationship of radionuclide discharges from anticipated operational occurrences to "as low as practicable" concepts.

As we noted previously, the evaporator in the liquid waste treatment system has a smaller capacity than do evaporators in many other nuclear plants. However, because plant wastes are segregated and the steam generator blowdown treatment system can be used for treating liquid wastes, the liquid waste systems may be sufficient to control liquid radioactive effluents to levels which can be considered "as low as practicable." However, the draft statement and FSAR have not evaluated the potential leakage of radioactive liquids from the secondary coolant system. Based on limited data from operating PWR's, this leakage may be of a volume comparable to that discharged via steam generator blowdown. Since this leakage is not addressed in the draft statement or in the FSAR, it is not clear if it is to be monitored or if it can be treated. Thus, firm conclusions cannot be reached as to the adequacy of the liquid waste management system to provide "as low as practicable" discharges. Therefore, the final statement should include: (1) an evaluation of the volume of anticipated secondary system leakage, (2) an estimate of the concentrations of radionuclides in the leakage, and (3) an evaluation of the waste treatment system capability to process this waste. Furthermore, it should include a summary of the technical specifications covering the liquid waste discharges.

Dose Assessment

The most significant dose consequences that are expected to occur as a result of the operation of the Kewaunee Nuclear Power Plant are the potential thyroid doses. The draft statement estimated that daily consumption of milk from the nearest dairy (1,300 meters north) could result in a 45 millirem/year (mrem/yr) thyroid dose to a child. According to the draft statement, the applicant plans to return much of the on-site plant property to agricultural use after the plant commences operation. If this property is used for pasture, the potential thyroid doses may be even greater than those estimated in the draft statement. Furthermore, the estimated doses apparently do not include the dose from the 52 curies of ^{131}I discharged annually as estimated by the applicant from steam dumps to the stmosphere.

According to the draft statement, if a child drank milk from a "pooled" source made up of all the milk produced within 50 miles, the thyroid doses could be 0.19 mrem/yr. While we realize that there are no regional siting or dose criteria which might relate to operation of multiple reactors in a region, we believe that the final statement should include an evaluation of the environmental effects from both the Kewaunee and Point Beach nuclear power plant effluents.

Since a large part of the plant exlusion area extends into Lake Michigan, the potential whole body dose consequences from discharges of radioactive gaseous wastes will be higher within the exclusion area that those calculated at the periphery of the exclusion area where "as low as practicable" criteria are applicable. Since access to this area of the lake is uncontrolled, the final

statement should describe how compliance with Appendix I guidelines in the area will be demonstrated.

Although the proposed guidelines of Appendix I to 10 CFR Part 50 and the release limits of 10 CFR Part 20 do not apply to radiation doses from direct shine from facility components, we believe that these potential radiation doses should be evaluated in assessing the environmental impact of nuclear plant operation. The final statement should evaluate potential direct shine doses to persons at the nearest residence, at the critical boundary "fence post", and at the nearest shore of Lake Michigan. Details of the analysis, such as location of sources, source geometry, source strength and mechanisms to control source strength, should be presented in the final statement.

Transportation and Reactor Accidents

In its review of nuclear power plants, EPA has identified a need for additional information on two types of accidents which could result in radiation exposure to the public: (1) those involving transportation of spent fuel and radioactive wastes and (2) in-plant accidents. Since these accidents are common to all nuclear power plants, the environmental risk for each type of accident is amenable to a general analysis. Although the AEC has done considerable work for a number of years on the safety aspects of such accidents, we believe that a thorough analysis of the probabilities of occurrence and the expected consequences of such accidents would result in a better understanding of the environmental risks than a less-detailed examination of the questions on a case-by-case basis. For this reason we have reached an understanding with the AEC that they will conduct such analyses with EPA participation concurrent with review of impact statements for individual facilities and will make the results available in the near future. We are taking this approach primarily because we believe that any changes in equipment or operating procedures for individual plants required as a result of the investigations could be included without appreciable change in the overall plant design. If major redesign of the plants to include engineering changes were expected or if an immediate public or environmental risk were being taken while these two issues were being resolved, we would, of course, make our concerns known.

The statement concludes "...that the environmental risks due to postulated radiological accidents are exceedingly small." This conclusion is based on the standard accident assumptions and guidance issued by the AEC for light-water-cooled reactors as a proposed amendment to Appendix D of 10 CFR Part 50 on December 1, 1971. EPA commented on this proposed amendment in a letter to the Commission on January 13, 1972. These comments essentially raised the necessity for a detailed discussion of the technical bases of the assumptions involved in determining the various classes of accidents and expected consequences. We believe that the general analysis mentioned above will be adequate to resolve these points and that the AEC will apply the results to all licensed facilities.

NON-RADIOLOGICAL ASPECTS

Thermal Effects

The Kewaunee plant employs a once-through cooling system with a submerged intake structure and a shoreline discharge structure. Its expected thermal discharge characteristics appear to meet applicable Federal-State water quality standards. These standards, approved by the Federal Government in 1967, allow cooling water discharge temperatures as high as 89° F without mixing zone specifications. While temperature over 68° F is considered detrimental to the growth and migration routes of certain of the area's salmonids such as coho salmon and trout, the Applicant's permit authorizes the plant to discharge heated water up to 86° F.

Different thermal standards for the protection of biota of Lake Michigan were recommended at the Lake Michigan Enforcement Conference (LMEC) which convened on several occasions between March 31, 1970 and March 25, 1971 (recommendations are attached in Appendix A). The design and operation of this facility was reviewed and evaluated in conjunction with these recommendations.

It appears that the LMEC requirements will not be met by Kewaunee for the following reasons:

1) The 3°F isotherm may extend approximately 7000 feet from the discharge structure and may, therefore, exceed the "1,000 feet from a fixed point adjacent to the discharge" recommendation of the Conference.

2) The plumes from the Kewaunee and Point Beach plants may overlap.

3) The intake structure is located within an area that may be affected by the thermal discharge. In our opinion, closed-cycle cooling would eliminate these problems.

Thus, we recommend that the final statement indicate the means by which these potential problems will be resolved and describe the steps that will be taken to assure that the Kewaunee plant facilities and operation will be in accordance with the recommendations of the Lake Michigan Enforcement Conference.

Biological Effects

Since yellow perch have been identified in the area of the plant site and are important in the Lake Michigan ecology, the final statement should discuss the potential effects of the thermal plume on the spawning success of yellow perch attracted to it during the winter. These fish require a winter chill period to initiate gonadal development. This chill period may not be met if they remain in the plume area for extended periods. To date, investigations by the Applicant show no evidence of any nursery areas in the vicinity of the plant. There is, however, the possibility that the investigations are not complete or that the spawning area and thermal plume area may overlap at some later date.

The statement indicates that the spring thermal barrier tends to inhibit mixing between the open lake and the nutrient-rich, inshore waters. The effect of this spring thermal barrier on the thermal plume heating of the trapped inshore water with possible increase in green and bluegreen algae growth should be addressed in the final statement.

The overall stress on the aquatic environment in the region of the Kewaunee plant should be evaluated in the light of the plant's contribution to the cumulative

biotic stresses from all sources in this part of the lake. Other biotic stress may include: (1) Municipal sewage treatment plants which discharge treated wastewater into the lake from the communities of Algona, Casco, Kewaunee, and Luxemburg, (2) Small villages in the vicinity which rely on private, single-family sewage disposal means, (3) Dairy plants, which furnish the principal industrial wastewater sources. These sources contribute varying amounts of organic material to the Lake. This encouragement to eutrophication could be further assisted by the warm water of the thermal plume.

In addition to the bubble curtain which is incorporated in the plant design, fish entrainment at the cooling water intake may be further reduced by adding an electric probe system. This is suggested because the effectiveness of a bubble curtain as a deterrent is limited by many variables such as currents, fish variety, turbidity, etc.

Chemical Impact on Biota

Sanitary wastes will be given secondary treatment (9000 gal/day capacity) and discharged in small quantity; chemicals in service water will be discharged in very dilute concentrations. Therefore, applicable chemical water quality standards will probably be met.

The evaluation of the discharges of pollutants, especially dissolved solids and compounds of phosphorus (plant nutrients) should take long-term effects into consideration. During periods of peak demand, approximately 25,100 gallons of spent regenerating solution will be neutralized and discharged (100 gal/min) to the lake every other day via the cooling system. This solution will contain an estimated 8800 mg/liter of total dissolved solids per discharge. One of the most important effects of these waste discharges will be their contribution to buildup of dissolved solid concentrations in Lake Michigan over a long period of time. This effect is caused by the very large volume of the lake in relation to the total inflow to the lake. It takes about 100 years to exchange the water in Lake Michigan, and each increment of pollution therefore adds to that already present. Historically, the concentrations of dissolved solids in Lake Michigan have increased continuously. The final

statement should consider such long-term effects of dissolved solids on the environment as well as alternative means of disposal.

The applicant does not yet know if chlorine will be added to the circulating water to prevent fouling. If it is found necessary to use chlorine, it will be in the form of sodium hypochlorite. In order to insure that the residual chlorine level of the receiving water be kept below that which EPA believes would be detrimental to the aquatic life of the plant area, the following is recommended: for intermittent discharges, the residual chlorine in the receiving water should not exceed 0.1 mg/liter for 30 minutes per day or should not exceed 0.05 mg/liter for 2 hours per day. The residual chlorine level of the receiving water may be monitored by the amperometric titration method. This is one of the most accurate methods for determining the quantity of free or combined, available chlorine. The applicant should consider the use of mechanical cleaning devices to eliminate the need for chlorine with its possibly long term toxic effect.

Monitoring and Surveillance

A monitoring program should be developed to measure the effect of the plant's waste discharge on the long-term increase of pollutant in the lake, especially dissolved solids.

A program for monitoring fish migration before and after startup and during shutdown should be conducted. According to the statement maturing coho salmon are known to migrate near the plant site.

ADDITIONAL COMMENTS

During the review we noted in certain instances that the draft statement does not present sufficient information to substantiate the conclusions presented. We recognize that much of this information is not of major importance in evaluating the environmental impact of the Kewaunee Nuclear Power Plant. The cumulative effects, however, could be significant. It would, therefore, be helpful in determining the impact of the plant if the following information were included in the final statement:

1. The shoreline of the plant site is subject to erosion, but the statement makes no mention of any efforts to control erosion. A properly monitored erosion control program should be instituted, and discussed in the final statement.

2. A discussion of (1) the types of hazardous liquids which are used at the site, (2) the control measures included for the protection of Lake Michigan from these liquids, and (3) the consequences to Lake Michigan of accidents involving these materials, should be included in the final statement.

3. The draft statement indicates that the plant's discharge structures are subject to sedimentation. Plans for offsetting such sedimentation should be discussed in the final statement.

4. Sanitary waste treatment is stated to include aerobic digestion with settling followed by chlorination and a polishing pond. This is not a clear discription. The term "aerobic digestion" probably refers to a tank aeration unit but does not eliminate the possibility of a lagoon with no sludge return. This sewage treatment facility was designed for 9,000 gallons

per day. This should be adequate for a work force of approximately 100, along with visitors to the site. The type of sanitary waste-water treatment should be clarified and assurance should be given that the plant is approved by the state.

5. Although the sewage treatment plant treats a very small amount of waste, the discussion should include the method of sludge disposal and the plant efficiency. Since the plant has been in operation for some time, such information should be available.

6. The annual average atmospheric dilution factors as a function of direction should be given.

7. An analysis of the potential effects of accidents which will release non-radioactive volatile materials should be presented, including: (1) types and quantities of materials, (2) the probabilities of accidents, and (3) the environmental impact.

8. A description should be given of the numbers and kinds of emergency boilers, space heating equipment, and diesel generators, including the capacity, fuel type, fuel sulfur content, and annual use rate. (All such equipment should conform to local and state requirements for fuel use, storage, and emission controls.)

9. It is not clear why some solid refuse is to be buried on-site, while other refuse is transported off-site for burial. This should be clarified in the final statement. (Any landfill operation employed should meet state and Federal regulations and should be state licensed.) Also, it is not clear whether the landfills mentioned on page III-33 and page IV-1 of the

Appendix A

Lake Michigan Enforcement Conference Recommendations

The approved recommendations of the Conference are as follows:

In order to protect Lake Michigan, the following controls for waste heat discharges are concurred in by the Conferees representing Indiana, Michigan, Wisconsin, and the U.S. Environmental Protection Agency. Municipal waste and water treatment plants, and vessels are exempted from the recommendations.

I. Applicable to all waste heat discharges except as noted above:

1. At any time, and at a maximum distance of 1,000 feet from a fixed point adjacent to the discharge, (agreed upon by the state and Federal regulatory agencies), the receiving water temperature shall not be more than 3°F above the existing natural temperature nor shall the maximum temperature exceed those listed below, whichever is lower:

	Surface 3 feet
January	45
February	45
March	45
April	55
May	60
June	70
July	80
August	80
September	80
October	65
November	60
December	50

2. Water intake shall be designed and located to minimize entrainment and damage to desirable aquatic organisms. Requirements may vary depending upon local situations but, in general, intakes

draft statement are the same; this should be clarified in the final statement.

10. The final statement should include a discussion of noise abatement measures to be used during the remaining construction activities and plant operation.

are to have minimum water velocity, shall not be influenced by warmer discharge waters, and shall not be in spawning or nursery areas of important fishes. Water velocity at screens and other exclusion devices shall also be at a minimum.

3. Discharge shall be such that geographic areas affected by thermal plumes do not overlap or intersect. Plumes shall not affect fish spawning and nursery areas nor touch the lake bottom.

4. Each discharger shall complete preliminary plans for appropriate facilities by December 31, 1971, final plans by June 30, 1972, and place such facilities in operation by December 31, 1973. However, in cases where natural draft towers are needed, this date shall be December 31, 1974.

5. All facilities discharging more than a daily average of 0.5 billion BTU/hour of waste heat shall continuously record intake and discharge temperature and flow, and make those records available to regulatory agencies upon request.

II. Applicable to all new waste heat discharges exceeding a daily average of 1/2 billion BTU/hour, except as noted above, which have not begun operation as of March 1, 1971, and which plan to use Lake Michigan waters for cooling:

1. Cooling water discharges shall be limited to that amount essential for blowdown in the operation of a closed-cycle cooling facility.

2. Plants not in operation as of March 1, 1971, will be allowed to go into operation provided they are committed to a closed-cycle cooling system construction schedule approved by the state regulatory agency and EPA.

In all cases, construction of closed-cycle systems and associated intake and discharge facilities shall be completed by December 31, 1974, for facilities utilizing natural draft towers and December 31, 1973, for all other types of closed-cycle systems.

III. The states agree to file with EPA within six months a plant-by-plant program identifying corrective actions for the modification of intake facilities, including power plants, municipal, and industrial users, to minimize the entrainment and damage to desirable aquatic organisms.

IV. The Conferees agree that there should not be a proliferation of new power plants on Lake Michigan, and that in addition to the above controls, limitations should be placed on large-volume heated water discharges by requiring closed-cycle cooling systems, using cooling towers or alternative cooling systems on all new power plants.