PRELIMINARY REPORT ON ENVIRONMENTAL CONSIDERATIONS RELATED TO SUSPENSION OF CONSTRUCTION ACTIVITIES UNDER CONSTRUCTION PERMIT NO. CPPR-80 FOR DAVIS-BESSE NUCLEAR PLANT

DOCKET NO. 50-346

by the

U. S. Atomic Energy Commission
Division of Radiological and Environmental Protection

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I. SUMMARY

The following is a summary of the results of the staffs' brief review of the applicant's Environmental Report with supplements relative to the environmental effects and benefits from the operation of the Davis-Besse Nuclear Plant:

1. The mechanical effects on the aquatic biota are small due to the reduced quantity of Lake Erie water used. The possibility of reducing the present 1.5 foot per second intake velocity to minimize entrainment of fish will be investigated in the detail review. An engineering modification can make the effect negligible.

2. The thermal effects of the cooling tower discharge on Lake Erie are negligible. The plume developed by the applicant shows an 1°F isotherm covering 2.14 acres and the longest dimension 658 feet. This work shows a considerable margin of safety with respect to encroachment on the nearest walleye spawning area, Locust Point Reef. Thus it is not likely that a serious thermal impact on the aquatic biota will be discovered as a result of the detailed NEPA review.

3. The fogging or icing is not expected to be serious problem in the detailed NEPA review even though more conservative meteorological and drift values will probably be used.

4. The proposed concentration of 0.2 ppm residual chlorine in the cooling water blowdown may cause an adverse impact upon aquatic biota in the outfall. Engineering solutions are available to minimize this concentration. The licensee is not planning the use of biocides such as chromates or polyphosphates. The added total solids resulting from sulphuric acid and sodium hydroxide addition are not considered detrimental at this time.

5. The expected total man-rem dose received from all effluent pathways for the estimated 1980 population in a 50 mile radius is calculated by the staff to be about 6 man-rem. This compares to 267,000 man-rem from natural background. The detailed NEPA review may find some changes should be made to further improve the processing systems.

6. The exposure of aquatic organisms which may be in undiluted discharge effluent including bioaccumulation factors would produce an annual dose for fish and invertabrates of about 200 mrad/yr.

7. Effects such as noise, aesthetics, historical places, aviation do not appear to be significant.

8. The benefits expected through the operation of the plant are approximately 6×10^9 Kw-hrs/yr of needed electrical power, approximately 600 acres of wildlife refuge, and a significant increase in the Ottawa County income through the increased tax base.

II. Site and Plant Description

A. Site: The site is located on the south shore of Lake Erie in a rural farm area more than 20 miles from the population centers of Toledo and Sandusky. The nearest municipality of Oak Harber (1960) population of 2903) is approximately six miles distant from the site. Camp Perry - Erie Industrial Park approximately 2.8 miles from the site is the nearest intake of Lake Erie water used for drinking water. The 954 acres of the site, including about 600 acres of marshland, has approximately 7,250 feet of frontage on Lake Erie. The marshland is part of a larger amount bordering the lake and owned or operated by private as well as Federal and State agencies as wildlife preserves.

Repair of old dikes, addition of new dikes, and installation of pumps for controlling water level in the marshland will provide the 600 acres under the U.S. Bureau of Sports Fisheries and Wildlife control and the conversion of a private game marsh to a preserve area. The principal portion of the site (Navarre Marsh) was acquired from the U.S. Bureau of Sport Fisheries and Wildlife in exchange for Darby Marsh which had been an established private game marsh area.

The north and east of the site is bounded by the lake, while to the west and south it is bounded by farmland and the Toussaint River, respectively.

The Toussaint River is a spawning area for bass and catfish while the Locust Point Reef is the closest off-shore walleye spawning area in the lake.

B. Plant Description

The Davis-Besse Nuclear Power Station will utilize a nuclear reactor of the pressurized water type which will have a net power rating of 2633 megawatts thermal (MWt) and 872 megawatts electrical (MWe). The maximum power capacity is 2772 MWt and 906 MWe. The pressurized water nuclear reactor steam system is to be furnished by the Babcock & Wilcox Company, the architect-engineer and construction manager is the Bechtel Company, and the turbine generator will be supplied by General Electric.

The plant cooling system includes a large natural draft cooling tower to extract the heat from the condenser cooling water. This hyperbolic shaped tower will be 493 feet tall and have a diameter of 414 feet at the bottom and 275 feet at the top. This system will release approximately 98% of the waste heat directly to the atmosphere. The remaining 2% will be released in discharge water to the lake.

The cooling tower, as well as the 220 foot high shield building, will be easily visible from off-site locations due to the relatively

flat terrain. However, by utilizing the cooling tower system instead of direct once-through lake water cooling, the amount of heat released to the lake is substantially reduced. In addition, the cooling tower obviates the need for an open intake channel to the lake for the large quantity of water necessary for direct cooling. The intake pipe in the present design will be located below the lake bottom and extend to an underwater intake crib located 3000 feet off shore. This will allow the beach to be returned to its original condition.

The plant buildings occupy a graded and fenced area of 56 acres at approximately the center of the 954 acre site. The distance from the plant to the nearest point on the lake shore is 3000 feet. The cooling tower is located at the northwest corner of the 56 acres and is about 1500 feet from the nearest boundary of the site.

III. Environmental Considerations

A. Mechanical Effects

The revision of the Davis-Besse waste heat removal from the once-through condenser cooling system using 685,000 gpm of Lake Erie with direct open discharge 18°F above lake ambient temperature to the wet-cooling tower system resulting in a maximum intake of 42,000 gpm and 13,800 gpm discharge at 20°F above lake ambient temperature results in at least a 94% reduction in possible entrainment of aquatic biota (i.e., eggs, larvae, juvenile fish, other weak swimming organisms, and plankton) because of the smaller amount of lake water involved.

A corollary to the reduced entrainment is a reduced impingement of the juvenile fish because of the proportionately smaller absolute number of juvenile fish involved due to reduced water usage. The horizontal intake structure described by the applicant during the winter will have as high as 42,000 gpm flow and a corresponding 1.5 ft. per second entrance velocity. During this cold period fish tend to become entrained at lower velocities than in warmer periods because of their slower reaction time in reduced temperatures. It is possible that the more detailed NEPA evaluation will find that entrainment and impingement of the juvenile fish sufficient to require modification of the intake structure to result in a lower entrance velocity. The lower velocity can be achieved by an engineering modification.

B. Thermal Effects

1. The condenser-cooling tower system circulates 480,000 gpm with 20,000 gpm makeup, evaporates 7500 to 10,400 gpm of water and has a maximum blowdown including dilution water of 13,800 gpm at 20°F. maximum above take water ambient temperature. The total heat rejected to the lake will be 138 x 10^6 Btu/hr discharged 1300 feet beyond the shoreline at the six foot depth through a slot type orifice which promotes rapid mixing by jet action. The resulting thermal plume has been predicted by the applicant as 2.14 acres for the 1°F. isotherm perimeter with the longest dimension of 658 feet. The prediction indicates a considerable margin of safety with respect to encroachment on the nearest walleye spawning area Locust Point Reef some three miles offshore. The only other spawning area reported near the plant is the catfish and bass spawning area in the Toussaint River. Our preliminary conclusion is that these discharges will have no significant impact on the spawning areas.

2. The 493 foot high natural draft cooling tower dissipates 6.2 x 10^9 Btu/hr waste heat through evaporation. The evaporative process under certain weather conditions may produce fog and in some cases ice. The licensee estimates

that the average length of the visible plume will be 1.5 miles and that the vapor cloud will not be visible over population centers of Port Clinton or Toledo, nor present an aircraft hazard.

The licensee has calculated the probability of increased occurrence of fog conditions because of the cooling tower evaporation to be 0.42%. Increased icing is predicted to be negligible.

A preliminary review of the licensee's evaluation of the impact of the tower plume indicates that they appear reasonable. The detailed NEPA review may change the average meteorological data and possibly the moisture lose due to drift from 0.01% to 0.03%, but these changes would not be expected to produce significant changes in the impact of fogging or icing due to the tower.

C. Chemical Effects

All the water required for the Station will be withdrawn from Lake Erie. Except for those times of the year when the temperature rise in the condensers is greater than 20°F. approximately 20,000 gpm will be withdrawn from and 10,000 gpm returned to the lake. Aside from small volumes of water taken for Station potable use, sanitary and primary or secondary systems make-up (demineralizers), the total flow is used for cooling station service systems (turbine cooling, etc.) and make-up supply for the closed-cycle condenser cooling system.

The effluent from the plant will contain chemical wastes from the sanitary sewage facilities, dissolved sodium and sulphate ions from the regeneration of supply water demineralizers, and blowdown from the closed-cycle circulating cooling water system. These wastes are discharged through a common mixing basin and the volume of wastes discharged from the first two sources is minor in comparison to the third. At the present time, the only chemicals which will be used during the operation of the plant and discharged into Lake Erie are sulphuric acid, sodium hydroxide, gaseous chlorine, and sodium hypochlorite.

A concentration factor of 2 was chosen for dissolved solids in the design of the cooling tower which results in a blowdown of approximately equal to the evaporative and drift loss. This results in a concentration of dissolved solids approximately double (450 ppm) that of the make-up water from the lake (225 ppm). This factor was chosen by the licensee for two reasons, to reduce the problems of scale formation on condenser tubes and to keep total dissolved solids as low as possible. The licensee intends to operate its cooling systems without the addition of anticorrosion or scaling agents like zinc chromate or polyphosphates.

As the pH of the raw lake water is high (approximately 8.3), sulphuric acid will be added to lower the pH to essentially neutral (7.3). The sulphuric acid reacts with the calcium bicarbonate to produce calcium sulphate, which helps to reduce scaling. The concentration of sulphuric acid added (or residual sulphate), will be 60 ppm which represents an increase in total dissolved solids of less than 10 percent in the feed water.

Sulphuric acid and sodium hydroxide are used in the regeneration of the Station make-up demineralizers. These wastes are collected in a holdup tank, neutralized and discharged to the collection basin to mix with other station effluents. The holdup tank discharge

would be greater than 6000 ppm (on an intermittent basis) dissolved solids at 200 gpm, this represents only 2% of the major effluent from the cooling tower and would produce only 25% increase in dissolved solids over the normal lake water loading. Normal blowdown is discharged with a dissolved solids content of 1/20 of the normal lake water content.

The only other major chemical used in the plant will be chlorine (as gas or sodium hypochlorite). The intake water will be chlorinated to 0.5 ppm free chlorine immediately ahead of the service water pumps. This chlorination will be intermittent, occurring for four periods of 30 minutes each day, to prevent algae growth and buildup in the Station systems. The applicant intends to inhibit all biological growths in the main cooling system. In order to achieve this, the applicant will also chlorinate after the makeup water intake and ahead of the condenser in the closed loop system continuously to maintain a free chlorine level of 0.5 ppm at the outlet of the condenser. While most of this added chlorine will be lost to the atmosphere with evaporation of water in the cooling tower, there will be a residual concentration of chlorine (probably as chloramines) in the cooling tower blowdown. The concentration in the tower blowdown water is estimated to be less than 0.2 ppm. As this blowdown will be discharged to the lake, under normal

conditions undiluted to any large extent, the concentration of available chlorine at the mouth of the discharge pipe will be approximately the same. Chlorine gas and sodium hypochlorite are also used in the treatment of potable water and sanitary wastes. The concentration of residual chlorine in the sanitary waste is 0.5 ppm but as the flow in relation to the cooling tower blowdown is so small, this concentration has no effect on the final residual chlorine at the outfall.

The discharge of chemicals to the lake, other than chlorine, will have no detrimental effect on the environment as the discharge contains virtually no chemicals other than these taken from the lake concentrated by a factor of two. No other known toxic chemicals are added in the plant.

The concentrations of chlorine likely to be discharged, on the other hand, could cause environmental harm in the immediate vicinity of the discharge pipe. This area will be developed in the full NEPA review and if it is determined unacceptable harm is indicated, engineered modifications and operating procedures will be required to minimize the impact.

In the start-up and maintenance procedures other chemicals will be used to clean all parts of the system. The chemicals involved will include alkali phosphates and various chelating agents. The liquid wastes will not be discharged through the normal systems but taken away from the plant in trucks for disposal elsewhere by a contractor.

D. Radiological Effects

During routine operation of the station at full power, small quantities of radioactive materials will be released to the environment. Preliminary estimates of the probable release rates of radionuclides have been made, based upon experience with comparable operating reactors and an evaluation of the procedures, equipment, and mode of operation at the Davis-Besse station.

The potential radiation doses to residents, within a 50-mile radius of the station, have been calculated using the preliminary releases listed in Tables 1 and 2, and using conservative assumptions relative to dilution, biological accumulation in food chains and use factors for people. The results of the radiation dose estimates are presented in Table 3 as annual doses at equilibrium conditions to individuals at various locations.

1. Radioactive Materials Released in Liquid Effluents

The liquid effluent from the station is discharged into Lake Erie at a rate of approximately 20,000 gpm. The expected annual average concentration based on Table 1 will be about 1.25×10^{-7} µCi/cc for fission and activation nuclides, and 2.5×10^{-5} µCi/cc for tritium. The primary source of potable water in the area is Lake Erie. The closest potable water

intakes serve Camp Perry, the Erie Industrial Park, and surrounding residences and are located approximately 3 miles from the Station. The Port Clinton potable water intake is 8 miles east and the Toledo and Oregon intake are 13 miles west. It was assumed that the water intakes at the above distances contained radionuclides diluted by factors of about 200 and 1000 from the discharge effluent, and that consumption of the water by residents occurred 24 hours after the water leaves the effluent pipe. Under those assumptions the total body dose to an individual drinking 1.2 liter/day would be 1.4×10^{-2} mrem/yr, 4.7×10^{-3} mrem/yr, and 2.8×10^{-3} mrem/yr for the respective distances. The dose to the thyroid of an individual at Camp Perry would be about 0.13 mrem/yr.

If an individual were to consume 20 gm of fish per day, 24 hours after it was caught from Lake Erie around Camp Perry, where the average dilution is approximately 1:200, the total body dose would be 0.04 mrem/yr. Doses to the thyroid and GI tract are indicated in Table 3.

The external total body dose to an individual swimming and boating for 100 hr/yr at each activity in waters containing reactor effluents at a 1:200 dilution was calculated to be 0.05×10^{-2} mrem/yr.

2. Radioactive Materials Released to the Atmosphere

The applicant estimates a χ/Q at the site boundary of 1.5×10^{-6} sec/m^3. Using this value and the preliminary estimate of noble gas releases listed in Table 2 the total body dose was calculated to be about 0.3 mrem/yr. This value would be lower if occupancy and shielding factors from being part-time indoors were considered.

The dose from iodine to the thyroid of a child assuming an intake of 1 liter of milk per day produced by a cow grazing at the site boundary for five months per year was calculated to be about 40 mrem/yr. There is no information in the Applicant's Environmental Report concerning location of cows near the site boundary; however, the surrounding area is largely agricultural. Based on this preliminary evaluation, the licensee may need to consider additional steps which will reduce or limit iodine releases and/or institute off site measurements and controls to insure that thyroid doses via the milk route are as low as practicable.

3. Population Doses From All Sources

The annual integrated population dose for the approximately 680,000 persons who may get all of their drinking water from Lake Erie is estimated to be about 2 man-rem. Table 4 lists the water supply data used in making this estimate.

The applicant estimates that 1,280,000 pounds/yr of edible fish are obtained from District 1, Lake Erie. We have assumed the population within 50 miles of the plant consumes the entire fish harvest and that all fish were obtained from waters diluted by a factor of 1:200 of that in the discharge effluent, after 24 hour decay. The integrated total-body population dose was calculated to be 3.3 man-rem/yr.

The integrated total-body dose to the population living within 50 miles of the Davis-Besse Station from submersion in radioactive gaseous effluents was estimated to be less than 1 man-rem/yr. The cumulative dose and average dose versus distance from the plant are summarized in Table 5.

4. Evaluation of Radiological Impact

The total man-rem dose received from all effluent pathways by the approximately 2,670,000 people (1980) who may live within the 50-mile radius of the plant, as shown in Table 6, was calculated to be about 6 man-rem based on routine operation of the Davis-Besse Station. For comparison, a dose of about 0.1 rem/yr/person from naturally occurring radioactive materia. results in an annual total population dose of about 267,000 man-rem.

Thus, routine operation of the station is expected to contribute an extremely small incremental dose to that which area residents already receive as a result of natural background.

5. Radiological Environmental Monitoring

The Applicant's Environmental Report indicates that a comprehensive environmental monitoring program will be started prior to operation to determine the magnitude of the natural radioactivity in the environment surrounding the station and will include environmental sampling of lake and well water, soil, air particulate matter, farm products, lake biota and bottom sediments. This program will continue after station operation commences to detect and evaluate any change in radioactivity of the environment due to operation of the station. The results of these programs will be submitted to both federal and state agencies as required and will be available to any interested groups or individuals.

The applicant's radiological monitoring program will be further defined in the Final Safety Analysis Report and the Technical Specifications.

TABLE 1

ESTIMATED ANNUAL RELEASE OF RADIOACTIVE MATERIAL IN LIQUID EFFLUENT FROM DAVIS-BESSE NUCLEAR POWER STATION

Nuclides	Ci/yr	Nuclides	Ci/yr	Nuclides	Ci/yr
Rb-86	.000038	Rh-106	.000005	Ba-140	.00021
Rb-88	.11	Sb-125	.000001	La-140	.00009
Sr-89	.00018	Sb-127	.000001	Ce-141	.000032
Sr-90	.000006	Te-125m	.00016	Ce-143	.000018
Sr-91	.00001	Te-127m	.00013	Ce-144	.000017
Y-90	.000034	Te-127	.0003	Pr-143	.000027
Y-91m	.0013	Te-129m	.0014	Pr-147	.000019
Y-91	.013	Te-129	.001	Nd-147	.000011
Y-93	.00033	Te-131m	.001	Pm-147	.000002
Zr-95	.000028	Te-131	.00019	Np-239	.00025
Zr-97	.000013	Te-132	.012	Cr-51	.00033
Nb-95	.000028	I-130	.0048	Mn-54	.00012
Nb-97m	.000013	I-131	1.22	Fe-55	.00033
Nb-97	.000014	I-132	.22	Fe-59	.0001
Mo-99	.15	I-133	1.38	Co-58	.085
Tc-99m	.11	I-135	.52	Co-60	.008
Ru-103	.000021	Cs-134	.49		
Ru-106	.000005	Cs-136	.20	Total $\sim$ 5.0	
Rh-103m	.000021	Cs-137	.34	Tritium 1000	
Rh-105	.000011	Ba-137m	.001		

TABLE 2

ESTIMATED ANNUAL RELEASE OF RADIOACTIVE MATERIAL IN GASEOUS EFFLUENTS FROM DAVIS-BESSE NUCLEAR POWER STATION (2772 MWt)

CURIES/YEAR

Nuclide	Waste Gas Processing System (60 days Holdup)*	Condenser Air Ejector	Auxiliary Bldg.	Containment Purge	Turbine Bldg.	Total
Kr-83m	-	2	2	-	-	4
Kr-85m	-	8	8	-	-	16
Kr-85	695	6	6	11	-	718
Kr-87	-	5	5	-	-	10
Kr-88	-	14	14	.1	-	28
Kr-89	-	.5	.5	-	-	1
Xe-131m	15	7	7	2.4	-	32
Xe-133	23	15	15	1	-	54
Xe-135m	-	1150	1150	190	-	2490
Xe-135	-	1	1	-	-	2
Xe-137	-	24	24	.3	-	48
Xe-138	-	1	1	-	-	2
Total	733	1237	1237	205	-	3410
I-131	-	0.2	0.01	0.05	0.3	0.5
I-133	-	0.1	0.01	0.01	0.1	0.2

*The PSAR did not give the capacity of the storage tanks; however, the applicant in the Supplement to the Environmental Report committed himself to at least a 60 day holdup time.

TABLE 3

ANNUAL DOSES AT EQUILIBRIUM CONDITIONS
TO INDIVIDUALS AT VARIOUS LOCATIONS

LOCATION	PATHWAY	TOTAL BODY DOSE Mrem/yr	THYROID/DOSE Mrem/yr	GI TRACT DOSE Mrem/yr
Site Boundary	Cloud	0.3		
Site Boundary	Ingestion of Milk		~40*	
Camp Perry-Erie Industrial Park	Ingestion of Water	1.4×10^{-2}	0.13	0.09×10^{-2}
	Ingestion of Fish	4.0×10^{-2}	0.20×10^{-2}	0.90×10^{-2}
Port Clinton	Ingestion of Water	4.7×10^{-3}	0.04	0.03×10^{-2}
	Ingestion of Fish	1.0×10^{-2}	0.08×10^{-2}	0.30×10^{-2}
Toledo-Oregon	Ingestion of Water	2.8×10^{-3}	0.03	0.02×10^{-2}
	Ingestion of Fish	8.4×10^{-3}	0.05×10^{-2}	0.20×10^{-2}

* Dose to child from a daily intake of 1 liter of milk derived from cows grazing at this site for 5 months per year.

TABLE 4

MUNICIPAL DRINKING WATER SUPPLY INTAKE DATA
(WITHIN 30 MILE RADIUS OF DAVIS-BESSE STATION)

MUNICIPALITY	INTAKE DISTANCE (Miles)	POPULATION (1980)	ESTIMATED* DILUTION FACTOR
Camp Perry-Erie Industrial Park	3	2380 (0-5 mi)	1:200
Port Clinton	8	11100 (5-10 mi)**	1:600
Toledo-Oregon	13	663000 (5-30 mi)**	1:1000

* Haung, Joseph C-K, "Estimation for Concentration Distributions for Conservative Material Released from a Continuous Point Source on the West Basin of Lake Erie."

Okubo, A. and S. S. Farlow, "Analysis of Some Great Lakes Drogue Studies," Proceedings of the 10th Conference on Great Lakes Research 1967.

** Population does not include all sectors in annuli.

TABLE 5

CUMULATIVE POPULATION, ANNUAL MAN-REM DOSE AND AVERAGE ANNUAL DOSE FROM GASEOUS EFFLUENT IN SELECTED CIRCULAR AREAS AROUND THE DAVIS-BESSE STATION

Cumulative Radius (Miles)	Cumulative Population (1980)	Cumulative Dose (Man-Rem)	Average Dose (Mrem)
1	229	0.018	0.079
2	731	0.025	0.034
3	1,260	0.027	0.021
4	1,670	0.029	0.017
5	2,430	0.031	0.013
10	16,000	0.047	0.003
20	121,000	0.096	0.008
30	828,000	0.26	0.0003
40	1,400,000	0.41	0.0003
50	2,670,000	0.75	0.0003

TABLE 6

ESTIMATED ANNUAL MAN-REM DOSES
FROM DAVIS-BESSE STATION

PATHWAY	ESTIMATED DOSE - MAN-REM/YR
Cloud*	0.8
Ingestion of Water**	2.0
Ingestion of Fish*	3.3
Transportation of Nuclear Fuel and Solid Wastes	~ 0.5
	~ 7.0

* Within 50-mile radius of station.
** Within 30-mile radius of station.

6. Radwaste Systems

Radwaste treatment systems planned for Davis-Besse utilize state-of-the-art developments to the feasible limits of present proven technology and are clearly equal to, or better than, systems at comparable sites (e.g., Palisades). Specifically, the overall decontamination factors available in the clean and miscellaneous radwaste systems, 10^7 to 10^8, would be difficult to improve upon. With the present system tritium release, for which no effective removal methods are available at the present, is retained in-plant by recycling so that much of it will decay and releases will be minimized.

Gas radwaste systems similarly provides maximum holdup of 60 days, so the gas-borne releases are currently dominated by krypton-85. With an 11 year half-life, and noble gas chemistry, krypton-85 cannot be significantly depleted by any currently feasible system of further holdup or chemical treatment.

Possible improvements are: (1) decreasing primary coolant leakage into containment, into the secondary loop and into the miscellaneous radwaste system, and (2) routing the gas

phase of the secondary air ejector and the miscellaneous radwaste evaporator through the present 16,000 cfm filter--charcoal system before venting.

7. Radiation Dose to Species Other Than Man

In the absence of guidelines, it is generally agreed that the limits established for man are very conservative when applied to plants and the lower animals. Terrestrial organisms in the environs of the station would receive approximately the same radiation doses as those calculated for man. Of the lower organisms which inhabit the environment of the Davis-Besse Station, those which will receive the most significant doses are the aquatic organisms which are likely to live in the undiluted discharge effluent. The calculated dose to these organisms is based on the releases listed in Table 1 and the bioaccumulation factors[1] for those isotopes. The average annual dose rates to fish and invertebrates would be about 180 and 210 mrad, respectively. The dose rates to aquatic organisms living at other locations would be much lower due to reduced concentration.

(1) Chapman, W. H., H. L. Fisher and M. W. Pratt, "Concentration Factors of Chemical Elements in Edible Aquatic Organisms," UCRL-50564, December 30, 1968.

E. Accident Assessment

An examination of accident assessments in environmental statements for plants similar to Davis-Besse indicates that realistically estimated radiological consequences of the postulated accidents in classes 1-8 of the proposed amendment to 10 CFR Part 50, Appendix D published on December 1, 1971 will probably result in exposure of an assumed individual at the site boundary to concentrations within or near the limits of Table II of 10 CFR Part 20. The estimated integrated exposure of the population with 50 miles of the plant from each accident would be orders of magnitude smaller than that from naturally occurring radioactivity.

F. Other Effects

1. Historical Places

The applicant has indicated that the site does not include areas of historic significance recorded with the National Register of Historic Places, Ohio Department of Natural Resources, or the Ohio Historical Society. As such, there is no impact upon Historical properties. The applicant does not appear to have considered possible impact of transmission lines on Historic Sites. The detail NEPA review will consider this possibility.

2. Aesthetics

While the use of the natural draft cooling tower significantly reduces adverse impacts on the site ecosystem, but it does present an adverse impact from an aesthetic point of view. The 493 foot concrete cooling tower will present a massive and extremely prominent landmark visible for miles in the flat terrain.

3. Aviation

The height of the tower and fogging by the tower required consideration of possible hazard to aviation. The Federal Aviation Agency has determined proper lighting required for the tower to meet the standard of Subpart C, Part 77, Federal Aviation Regulations and as such does not pose a hazard to air navigation.

4. Noise

The design and operation of the nuclear power plant using a natural draft cooling tower should not offer a significant noise level with adverse effects on the surrounding area human or wildlife population. The only area that might desire further study in the detail NEPA review is the noise level with the emergency diesels running. It might be that the noise level may be such as to require testing on a schedule with the least effect on the wildlife in the marsh.

5. Transportation

Consideration of transportation accidents of cold fuel, irradiated fuel and solid waste has been reviewed in light of the evaluation made in preparing the impact for the Enrico Fermi Plant.

Radiation exposure during normal accident free transport of irradiated fuel assuming 270,000 people, 900 mile route, 8 shipments, 10 persons handling shipment would be 0.2 man-rem for population and 0.1 man-rem for 10 persons handling shipment. The exposure represents a negligible amount compared to the annual dose of 27,000 man-rem received by the people due to naturally occurring radioactive materials.

IV. Benefit Considerations

The principal benefits of the Davis-Besse plant will be to provide over 6 billion kilowatt-hours of electricity per year for residential, commercial, and industrial customers in northern Ohio and to contribute 872 megawatts of capacity to enhance the reliability of power supply. Secondary benefits are providing employment during construction and operation, payment of local property taxes, and the addition to the National Wildlife Refuge System of over 600 acres of prime waterfowl habitat.