RETURN TO REGULATORY CENTRAL FILES
ROOM 016

UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the Matter of	)	
	)	
CONSUMERS POWER COMPANY	)	Docket Nos. 50-329 and 50-330
	)	
(Midland Plant Units 1 and 2	)	

APPLICANT'S REPLY TO SAGINAW INTERVENORS FEBRUARY 6, 1972 STATEMENT OF ENVIRONMENTAL CONTENTIONS

February 18, 1972

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1. Based upon objective engineering data, the cooling pond is of a size insufficient adequately to cool the water dissipated from the Plant during normal operations so as to prevent adverse thermal loading of the Tittabawassee River (hereafter "River"). Adverse thermal loading will impair any proposed plans to revitalize the River. Moreover, adverse thermal loading will lead to further degradation of the River and have at least the following undesirable environmental effects: (a) Decreased dissolved oxygen content; (b) Fish kills; (c) Reduction in benthic organisms; (d) Reduction in zooplankton; (e) Increase in undesirable phytoplankton; (f) Reduction in assimilative capacity for waste water treatment plant effluents; (g) Degradation of the quality of waters into which the River flows, including the Saginaw River and Lake Huron; (h) Increased undesirable burdens on municipal water treatment plants situated downstream.

Response: Intervenor's contention appears to be based on a misunderstanding of the cooling pond operation. The cooling pond is designed as part of a closed cycle cooling system. Discharges will be made only as necessary for control of dissolved solid build-up in the pond. As stated in Section 4.4.1 of Applicant's Supplemental Environmental Report (ASER) the discharge from the pond will be cooled by an additional cooling system to within approximately 1°F of the temperature of the river. At this temperature, the discharge will have no undesirable thermal effects on the river. This contention ignores Applicant's many filings since June of 1971 calling attention to the additional cooling system on the discharge and totally fails to set forth any facts to support the conclusionary statements contained therein.

2. Because of the meteorological conditions occurring at various times of the year in the geographical vicinities of the Plant, it is improbable, and, therefore, there exists no reasonable assurance, that sufficient make-up water for the cooling pond will be available. These meteorological conditions include inadequate rainfall, insufficient ground water, low relative humidity, sustained, high wind velocities, and sustained lack of cloud cover leading to increased solar input. As a result of these conditions, and the lack of available make-up water from sources other than the River, cooling facilities will result in higher thermal loading than contemplated in (1) above, aggravating the adverse environmental effects set forth in (1) above.

Response: Intervenors' contention makes no reference to actual flow conditions of the river as recorded by the United States Geological Survey. See ASER §4.4.1; PSAR answer to Question 2.6, Amendment No. 5, 11/3/69. These historical data indicate that a 90-day drought, when river flow is less than 350 cfs has a probability of 1 in 5 years. For the years of record, 1936 through 1969, the most number of days per year when river flow was less than 400 cfs was 110 days in 1949. The storage volume of the pond is based on being able to provide water for full-power operation of the plant during a drought with continuous river flow below 350 cfs for 100 days. This design assumes a conservative value of 40 cfs for average evaporation and seepage losses from the pond. This is an extremely conservative design in that it is very unlikely that there will be a one-hundred-day period during which it will be necessary to operate the plant continuously at full power or that even in extreme drought there will not be several days in which flow will exceed 350 cfs during a 100-day period.

During such a drought, some of the storage volume in the pond would be consumed and the level of the pond would decline. However, the pond would remain a closed cooling system and no thermal discharges would be made to the river. Even were there to be discharges, the supplemental cooling

2. (Contd)

system would cool these to within 1°F of the river. Therefore there would be no increase in the thermal loading to the river and no resultant environmental effects. This contention ignores Applicant's many filings regarding the additional cooling system and the actual history of river flow and is unsupported by fact.

3. If sufficient make-up water is unavailable from the River and, therefore, as asserted, no discharges are made from the cooling pond to the River, the efficiency of the Plant will be reduced (and on certain conditions available power from the Plant may be drastically reduced or limited) thereby adversely affecting users of electricity in the relevant franchise area who may, from time to time, rely upon the Plant for a dependable source of electricity. These conditions are further aggravated by the fact that as pond water drawdown occurs, the available surface water area for cooling decreases.

Response: Even though during drought periods the storage volume of the pond will be reduced and the water surface level lowered, the pond remains a part of a closed cycle cooling system. The pond has considerable thermal inertia and reacts relatively slowly to meteorological changes. It is expected that the day and night temperature swings with a low pond volume will have a wider range than with a full pond. However, the mean water temperature with full pond and partially filled pond are about the same. For the reasons given above, the lack of makeup water for a duration up to and including the design drought period, will not appreciably affect the overall efficiency of the plant.

A 90-day drought has a probability of occurence of 1 in 5 years as discussed in Answer to Contention 2. The 100-day storage capacity of the pond is designed on the basis of continuous plant operation at full power with a conservative allowance of 40 cfs for evaporation and seepage. In the highly unlikely event of a combination of continuous full-power operation and drought for 100 days, and if an alternate supply of pond makeup water could not be made available, it could be necessary to curtail plant power output.

The conditions described in this Contention would not be aggravated by reduction in pond level. As the pond is lowered, the surface area of the pond decreases due to the slope of the perimeter dikes and the baffle in

3. (Contd)

the middle. The reduction in pond surface area from full to minimum operating level is approximately 2.3 percent. However, for cooling pond calculations, the surface area assumed was at the low pond level, and the difference in pond surface areas does not significantly affect the pond temperature and performance. The Intervenors' concern about the reduction in the surface area for cooling is not based on any realistic analysis.

As stated above, the Intervenors' contentions about drastic reduction in power output from the Midland Plant are not valid. In addition, it should be known to the Intervenors that electric power supply to the Midland area is furnished from the total system of the Applicant and is not dependent upon a change in the output of the Midland Plant. One of the major reasons for maintaining reserves of up to 18-20 percent of peak demand is to protect against unlikely, but possible, forced outages such as could occur in the event of prolonged and improbable drought conditions. The system reserves are planned to be fully adequate to protect Applicant's customers against the partial derate that might result from such conditions. This contention contains no facts to support it and is in fact contrary to the facts.

4. During periods of insufficient make-up water, undesirable amounts of blue-green algae will proliferate in the cooling pond because of the high thermal content. These undesirable blue-green algae will cause obnoxious odors and adversely affect the health and life of aquatic and terrestrial organisms which will rely upon the cooling pond as a source of food and water. Applicants have suggested that they will control undesirable increases of blue-green algae with the use of massive amounts of chlorine or other undesirable and dangerous chemicals; however, use of chlorine and other undesirable and dangerous chemicals will also have an adverse effect upon the health and life of aquatic and terrestrial organisms which will use the cooling pond as a source of food and water.

Response: Inasmuch as the pond does not now exist, there are no aquatic or terrestrial organisms which rely on it as a source of food. The reasons why excessive productivity of algae is not expected in the pond are given beginning on Page 6.15-1 of the ASER. Chlorine damage to aquatic organisms in the pond is expected and desired, but as explained in the above referenced section there should be no significant impact on the river. Since a dramatic buildup of blue-green algae is not expected to occur, the obnoxious odors and adverse effects mentioned in the contention likewise cannot be expected to occur.

Terrestrial organisms which might frequent the pond for food and water would not likely be adversely affected because of the rapid dissipation of chlorine and the relatively greater tolerance to chlorine of terrestrial animals.

This contention is contrary to the facts and insufficiently specific.

5. Operation of the cooling facilities will result in undesirable fogging during certain parts of the year. Fogging will occur during periods when there is a significant difference between the ambient air temperature and the temperature of the cooling pond water. Fogging will be further increased during periods of such difference when there also exists average to high relative humidity. Under conditions conducive to fog, fog will be increased when there exists insufficient make-up water for the cooling pond. Fogging will cause at least the following undesirable environmental effects: (a) Decreased visibility on adjacent highways and roads, resulting in hazardous conditions; (b) Increase and directly cause icing on adjacent highways and roads during periods when the ambient air temperature is below 0° Centigrade, resulting in hazardous conditions; (c) Decreased visibility in the Midland Community, resulting in hazardous conditions; (d) Increase and directly cause icing in the Midland Community during periods when the ambient air temperature is below 0° Centigrade, resulting in hazardous conditions; (e) Decreased visibility in Dow Chemical and Dow Corning facilities, resulting in hazardous conditions; (f) Increase and directly cause icing in Dow Chemical and Dow Corning facilities during periods when the ambient air temperature is below 0° Centigrade, resulting in hazardous conditions, production outages, and dangerous conditions considering the types of raw materials and products used and produced at such facilities; (g) Destruction of plant life due to icing; (h) Destruction of wild birds due to icing; (i) Impair the efficiency of or break elevated objects, such as poles, wires, towers, and transmission lines.

Response: The contention states that fogging (1) will occur during periods when there is a significant difference between the ambient air temperature and the temperature of the cooling pond water and (2) be further increased during periods of such difference when there also exists average to high relative humidity. The Interim Report on fogging, ASER following Page 4.3-3, on Page 8, discusses the relationship between air-water temperature difference and relative humidity. The conclusion of the study was that correlation of the data with relative humidity did not contribute to occurrence-of-fog criteria and that temperature difference criteria remained the main dividing line. The report thus shows that occurrence of fogging is not increased, given the water-air temperature difference criteria, as a function of either average or high relative humidity. The reason for this is that

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average to high relative humidity is already present when there is a high water-air temperature difference. However, the presence of high rather than average relative humidity will tend to intensify the fog.

The contention states that under conditions conducive to fog, fog will be increased when there exists insufficient makeup water for the cooling pond. If the surface level in the pond should be decreased due to lack of makeup water, the change in average surface temperature due to such a surface level change will be very small. (Refer to answer to Contention 3.) Any temperature change would tend to elevate the average surface temperature in the late afternoon and to depress the average surface temperature in the dawn period. Referring to the Interim Report on fogging, ASER following Page 4.3-3, on Pages 4-5, it is stated that typically the fogging hours would occur during the predawn period of lowest air temperature. The contention is in error because the possible small water temperature depression which might occur in the dawn hours will tend to suppress fog rather than increase it.

The contention states a number of effects resulting from the fog and these effects are discussed seriatim below:

Fogging will cause at least the following undesirable environmental effects:

(a) Decreased visibility on adjacent highways and roads, resulting in hazardous conditions;

See ASER Page 5.1-23, wherein it is stated that (pond) "fogging" is defined as occurring when visibility drops to one mile or less. Fogging of this extent is not necessarily "a driving hazard." The contention concerning pond fogging should be considered in context

5. (Contd)

with natural fog in the area. At Midland, in winter, natural fog occurs 16.4 percent of the time. Thus, automobile operators in the area are familiar with fog and know how to proceed safely when fog is present.

(b) Increase and directly cause icing on adjacent highways and roads during periods when the ambient air temperature is below 0° Centigrade, resulting in hazardous conditions;

Ice or frost from pond fog has never been observed at ambient air temperature greater than 22°F (-5.6°C). The contention that pond fog ice forms below 0°C is not supported by observations. As stated in ASER, Page 5.1-23, road icing or frost of 0.001 and 0.002 inch is predicted as the only icing caused by the pond. Further description of icing is contained in the answer to Staff Question 22 at Page 6.22-1 of the ASER. This slight thickness of icing or frosting is not considered a hazard.

(c) Decreased visibility in the Midland Community, resulting in hazardous conditions;

This contention is similar to contention (a), and the response the same. This contention is vague and unsupported by facts.

(d) Increase and directly cause icing in the Midland Community during periods when the ambient air temperature is below 0° Centigrade, resulting in hazardous conditions;

This contention is similar to contention (b), and the response is the same. This contention is vague, and unsupported by facts.

(e) Decreased visibility in Dow Chemical and Dow Corning facilities, resulting in hazardous conditions;

To the extent that this contention refers to outside facilities, the contention is similar to contention (a) and is repetitious and

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vague. The response to this is the same as the response to contention (a). If the contention refers to interior, or inside of, plant buildings, there is no showing that atmospheric fogging, natural or pond-induced, can decrease visibility nor can expert opinion reasonably postulate such a situation.

(f) Increase and directly cause icing in Dow Chemical and Dow Corning facilities during periods when the ambient air temperature is below 0° Centigrade, resulting in hazardous conditions, production outages, and dangerous conditions considering the types of raw materials and products used and produced at such facilities;

1) As to the contention that ice from pond fog forms when air temperature is below $0^{o}C$, the response is the same as response to (b) above. 2) As shown on Page 5.1-27, ASER, natural icing, frost and snow conditions are common in the winter in the environs of the Midland Plant. Consequently, industrial plant design foresees such events and provides suitable countermeasures so that hazardous conditions, production outages, and dangerous conditions will not occur. Of course, the industries consider the types of raw materials and products used and produced at such facilities in their plant design criteria.

(g) Destruction of plant life due to icing;

This question was considered in the ASER, Page 6.22-1. At cooling ponds in both central Illinois and New Mexico, Bechtel investigators of cooling ponds have seen water grasses flourishing and green in the dead of winter. This is enhancement of plant life. Out from

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the edge of the pond, in the winter environment, no damage to plants from icing has been observed. To the extent that any frost or icing from the pond fog furnishes additional moisture to plants, the [illegible] life is thereby enhanced.

(h) Destruction of wild birds due to icing;

Cooling ponds are notable in providing shelter and resting means for migratory and water birds. No condition whereby pond fog ice destroys wild birds is postulated by experts on cooling pond fogging. The contention is not supported by facts.

(i) Impair the efficiency of or break elevated objects, such as poles, wires, towers, and transmission lines.

1) As to poles and towers, there is no reasonable postulation whereby frost or ice from cooling pond fog of the density and weight combination will cause impairment of efficiency of or breakage. No experience of this contention is found in the literature or by direct observation. 2) As to wires and transmission lines, it should be pointed out that the region around Midland is subject to frequent natural atmospheric icing events including such occurrences as sleet, sleet showers, freezing drizzle, freezing rain, and snow. In view of this, the wires and transmission lines in the area are designed and constructed to withstand this naturally-occurring phenomena. There is no showing that pond fog, ice or frost will actually increase the problem.

6. Regardless of the inadequacies of the size of the cooling pond, Applicant will be increasing, by operation of the Plant, the total dissolvable solids in the cooling pond and in the River. Although Applicant asserts that by the time of proposed operation of the Plant the level of total dissolvable solids existing in the River will be decreased, so as to permit an incremental increase as a result of the operation of the Plant, Applicant and the Regulatory Staff have failed to state how this will be accomplished. Increase in total dissolvable solids will cause turbidity on the River and cause various adverse effects, depending upon the nature of the total dissolvable solids, including but not limited to those set forth in (1) above.

Response: Applicant will increase the total dissolved solids (TDS) in the river by a very small amount from chemical discharges from the plant. The remainder of the TDS discharge from the pond will represent a concentration of solids previously in the river. The level of TDS in the river will decline as a result of the continuing efforts of the Michigan Water Resources Commission and local industry to improve river quality. Applicant is not aware of any studies indicating that discharges in the amounts and of the type described in its Supplemental Environmental Report into a river with the proposed parameters of the Tittabawassee River will cause turbidity or any significant adverse effects. In fact, existing studies indicate that effects of the type described by Intervenors will not be caused by the described discharges. This contention is unsupported by the facts.

7. Under certain conditions, Dow Chemical has contractually agreed to supply make-up water to the Plant. There is no discussion concerning where Dow Chemical will secure the make-up water, whether Dow Chemical will be able to supply the make-up water, whether such supply of make-up water by Dow Chemical will adversely affect the amount of water Dow Chemical itself may need for safe operations of the Dow Chemical and Dow Corning facilities, or whether such supply of make-up water will adversely affect the supply of water to the greater Tri-City area for drinking purposes, or affect the supply of water as a source of food and water to aquatic and terrestrial organisms within the affected geographic area.

Response: Dow Chemical Company has agreed to supply water to the Midland Nuclear Plant for the following purposes:

(a) Initial billing of steam systems and other systems;

(b) Continuous condensate return to process steam system;

(c) Continuous supply of water during operation for makeup to the in-plant steam and other systems;

(d) Potable water;

(e) Cooling water in the event the supply of cooling water from the Tittabawassee River is so reduced or restricted as to reduce electric production by 400 MWe or more.

Water for these uses will be delivered to the Plant from Dow facilities through pipelines connecting the nuclear Plant with Dow's Plant. The source of this water is Lake Huron. It is delivered to the Midland area by pipeline through the Saginaw-Midland water system to Dow facilities. This is the normal source of most of Dow's process water requirements. Dow has contracted to take up to 17 million gallons per day from the Lake Huron pipeline. The nuclear Plant will use about 400,000 gallons per day of makeup and potable water exclusive of the water Dow will use for makeup

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to the process steam system. Makeup to the process steam system will require about 5 million gallons per day of water. An equivalent amount of water is currently being used by Dow for makeup to the existing fossil fuel process steam system.

This water will be supplied through an existing system that has the required capacity.

No specific plans have been made for supply of cooling water by Dow because of the forecasted adequacy of the Tittabawassee River to supply such needs. In the extremely unlikely event that the supply of cooling water from the Tittabawassee River is restricted sufficiently to impose on Dow an obligation to supply cooling water, such cooling water would most likely be supplied by construction of a pipeline from Saginaw Bay to Midland along a right of way presently owned by Dow and used for other types of pipeline. The new pipeline would not create any new land uses and would not have any of the effects suggested in the contention. In any event this remote contingency is not a part of the project as presently constituted and it is neither useful nor necessary to consider it in this proceeding.

8. Applicant plans to discharge chemicals on a regular basis, during operation of the Plant, into the River and Bullock Creek.

Response: Applicant agrees that chemicals will be discharged which will cause insignificant effects.

9. Dow Chemical already discharges chemicals into the River and Applicant's discharges will have an additive and incremental adverse effect upon the life and quality of the River water, the organisms contained therein, the organisms which rely upon it as a source of food and water, and the ability to revitalize the River. The adverse effects will vary in severity depending upon the character of the chemical.

Response: This contention is incorrect and not based on facts. Dow has agreed with the Water Resources Commission to drastically reduce their discharges to the River by 1974 and to exercise much greater control over those discharges it will still make. Specifically, Dow has agreed to treat or control its industrial wastes to the extent that on or before January 1, 1974 and thereafter the discharge to the Tittabawassee River shall:

(a) Contain no total dissolved solids in quantities sufficient to raise the concentrations in the Tittabawassee River above seven hundred (700) milligrams per liter at the 7-day once in 10 year drought flow of two hundred sixty (260) cubic feet per second nor above proportionately lesser concentrations in the river at greater rates of river flow down to a maximum concentration of five hundred fifty (550) parts per million at river flow rates of one thousand (1,000) cubic feet per second or more.

(b) Contain no oxygen consuming substances in sufficient quantities as to lower the average daily dissolved oxygen concentration below five (5) milligrams per liter, nor one single value below four (4) milligrams per liter in the Tittabawassee River below the point of discharge during the 7-day once in 10 year drought flow. At greater flows, the dissolved oxygen shall be in excess of these values.

9. (Contd)

(c) Have a pH of not less than 6.5 nor greater than 9.0.

(d) Contain not more than thirty-five (35) milligrams per liter of suspended solids.

(e) Not, separately or in combination with wastes from other than Company sources, increase the temperature of the waters in the Tittabawassee River outside a zone of mixing as shall be designated by the Chief Engineer of the Commission, more than five degrees (5°) Fahrenheit above natural stream temperature, nor above levels specified in the following table:

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
41	41	50	63	76	84	85	85	79	68	55	43

(f) Contain not more than five thousand (5,000) total coliform per one hundred (100) milliliters.

(g) Contain no other substances in amounts sufficient to injuriously affect public health or welfare, or commercial, agricultural, and recreational water uses.

The Dow discharge will be downriver of Applicant's discharge and thus Dow must take into account all of Applicant's discharges in order to meet the above limits. Prior to operation of the nuclear power plant, Dow will have installed a central collection system where all liquid discharges which might contain chemicals either on a continuous release basis or from an accidental release will be collected and monitored continuously before release to the river. There will be one single discharge point for all such releases.

Applicant has stated in the ASER, Pages 6.15-1 through 6.15-5, that the temperature and the constituents of the nuclear plant discharge to the river will have no significant adverse effect on the aquatic life in the river.

10. Bullock Creek is an intermittent stream. During periods of the year when Bullock Creek is dry or nearly dry, Applicant's hot chemical discharge will be the only source of water in Bullock Creek. Since the discharges will be at least as high as temperatures from 80 to 125 degrees Fahrenheit, the severity of adverse effect during such dry periods will be increased.

11. Since Bullock Creek is a tributary to the River, any discharges into Bullock Creek are, in effect, discharges into the River, as well. There is, therefore, an insufficient analysis and discussion of the adverse effects of such discharges.

12. There is a failure to consider and analyze what adverse effects discharges into the Bullock Creek and the River will have upon other bodies of water into which the River runs, such as the Saginaw River and Lake Huron.

Response: Bullock Creek is an intermittent stream and, therefore, has no established aquatic life of any importance. There should be no concern as to the direct impact of any discharges thereto. These discharges to Bullock Creek are intermittent with low frequency. Applicant estimated the frequency to be 14 times per year on Page 6.13-1 of the ASER. This is a worst case estimate. A more likely frequency is once per year for this maintenance. The flow rate during condenser drainage is 3.2 CFS compared to average river flow of 1,500 CFS. This represents about 0.2% of river flow during the infrequent occurrence of this flow. The thermal effects represent a temperature increase after mixing of less than 1°F. Intervenors contention that this would cause any adverse effects is illogical and not based on any presentation of facts.

13. Since it is possible to remove chemicals by treatment prior to discharge into the Bullock Creek and the River, Applicant's proposed discharges represent an unwarranted cost to the environment. Applicants have not discussed methods of removal, such as the installation of a waste treatment system at the Plant itself or some method of using treatment facilities available at Dow Chemical and Dow Corning.

Response: Chemicals discharged from the Plant as listed in the ASER, beginning at Pages 6.3-1, 6.4-1 and 6.14-1, consist of chemicals brought to the Plant with the intake water and reaction products from chemicals used for the necessary treatment of the Plant steam and water systems. The consumption of chemicals will be controlled by metering pumps and precision instruments at feed rates relative to the Plant load and the quality of the makeup water.

The intake of various chemicals to the Plant and discharges were discussed beginning on Page 6.14-1 of ASER and are summarized in the Plant chemical balance, which is attached hereto as Table 13.

As shown in Table 13, most of the chemicals used will react with each other and other components in the water and produce neutral components identical or similar to existing constituents of the raw river water.

Also, as shown on Table 13, a slightly smaller total weight of dissolved solids is returned to the river from the Plant than is withdrawn from the river.

The column listing the amounts of discharged chemicals is a conservative estimate. The cooling pond as any large body of water will have some self-cleaning capability. This phenomena will result in a decrease of concentration of components with low solubility. However, no credit has been taken for this phenomena in the Applicant's analysis and calculations.

The overall changes in concentration of individual components in the river after mixing, due to chemical treatment and evaporative concentration

13. (Contd)

in the cooling pond, will be considerably less than recorded seasonal changes and they are well within the state Water Resources Commission standards.

All available techniques for removing the products of chemical treatment and other dissolved solids will require additional chemicals and energy, thereby increasing the total amount of waste products and heat to be disposed of to the environment. Thus, no ecological benefit is realized.

Several methods for removal of the individual chemical additives from the effluent stream and methods to decrease the total amount of dissolved solids in the Plant effluent were studied and evaluated. The methods described are theoretically possible but have never been used in the size required for this application. If an installation of these types of equipment were made for the purposes of containing the chemical discharges from this Plant, such an installation would be prototypical and considerable research and development would be necessary to scale up these theoretical processes to the size required.

Treatment of Condensate Demineralizer Regeneration Waste, Makeup Treatment Waste and Tertiary System Blowdown

Demineralizer regeneration and heat exchanger blowdown wastes can be segregated into two streams. One stream would have low solids content and could be discharged to the river or cooling pond. The second stream would contain virtually all the solids and would be concentrated by evaporation. Evaporation would require large amounts of energy. The concentrated stream or slurry from the evaporation process would consist of

13. (Contd)

about 70,000 pounds per day of slurry containing 3,500 pounds per day of soluble solids (and scale inhibitors added in the evaporator) which would have to be disposed by transporting to an off-site location.

Removal of Chemical Additives From the Cooling Pond Blowdown

Chlorine and sulfuric acid are added to the cooling pond to control biological and chemical fouling of the condenser tubes. Original conditions in the cooling pond blowdown (except for the concentration of existing river solids) can be restored by ion exchange of the pond blowdown. This would require a large number of ion exchangers and the use of 19,500 pounds per day of Na OH, 4,100 pounds per day of H_2SO_4 and 25,000 pounds per day of CO_2. Regeneration of these ion exchangers would produce 345,000 pounds per day of slurry containing 34,200 pounds per day of dissolved solids. This additional slurry would also be disposed of at an off-site location.

Zero Discharge From the Cooling Pond

A nonscaling condition in the circulating water can be maintained by continuously removing dissolved solids from pond water using a steam compression falling film evaporator with an input rate of 3,200 gallons. The evaporator would discharge 3,000 gallons per minute of clean water to the cooling pond and produce 200 gallons per minute of slurry. This system would require approximately 18 MW of electrical energy, scale inhibitors, and would increase heat rejection to the environment by 60×10^6 Btu per hour.

This system would require an additional 200 gallons per minute of river makeup water to replace the slurry being removed. The evaporator would

13. (Contd)

produce 840,000 pounds per day of slurry containing 84,000 pounds per day of dissolved solids and scale inhibitors. Again this would have to be disposed of off-site.

Disposal of Concentrated Waste

All the above methods produce concentrated solutions of soluble salts (slurry) which would have to be disposed of off-site in a large pond area of adequate capacity and other characteristics so as to minimize environmental effects of this disposal.

Benefit-Cost Analysis

Capital and operating costs for the above systems are pure conjecture at this point. For this reason and because of the uncertainties of scaling these laboratory processes up to the required size, these chemical systems cannot be considered as alternatives in the context of a benefit-cost analysis such as presented in the ASER, Page 5.1-11, et seq.

The foregoing indicates that contrary to the Intervenors' contentions, the Applicant has analyzed various systems of disposal of chemical wastes. The systems proposed for the Midland Plant will enable the Applicant to limit chemical discharges to levels that result in no significant adverse environmental effects and are well within all regulatory limits. Addition of new systems increases the overall wastes from the Plant and will have adverse effects on the environment.

13. (Contd)

TABLE 13

PLANT CHEMICAL BALANCE LB/DAY

Constituents	Constituents in the Intake Water			Chemicals Added in the Plant for Chemical Treatment & Corrosion Products					Constituents in the Discharge to River
	Tittabawassee River	*Lake Huron	Total Intake	Makeup Treatment	Conden Demin	F W Chem Control	Circ Water	Tertiary System	
Ca	19,000	32	19,032		26				19,058
Mg	9,500	10	9,510						9,510
Na	13,800	5	13,805	252	304			321	14,682
HCO_3	48,000	132	48,132						23,132
SO_4	21,600	8	21,608	523	1,190		19,000	405	42,726
Cl	38,900	4	38,904				400		39,304
NO_3		1	1						1
SiO_2		15	15		5			6	26
PO_4								174	174
NH_3						120			120
Fe					17			30	47
Cu					5				5
Al				2.4					2.4
CO_2	900	26	926						2,000
Poly-electrolyte				0.2					0.2
TDS	150,800	207	151,007						148,787.6

*As supplied by Dow.
Note: Solids added in the plant 21,707 pounds per day.
CO_2 discharged to atmosphere 25,000 pounds per day.

14. There is no discussion of the quantity or character of non-radioactive solid wastes which will be regularly discharged during normal operation of the Plant. Depending upon the method of disposal, there may be adverse environmental effects from such wastes.

15. There is a failure to discuss what relationship, if any, will result between non-radioactive solid wastes created by the Plant and non-radioactive solid wastes normally disposed of by Dow Chemical and Dow Corning. For example, there is no discussion whether such wastes will be used as landfill, what the organic and inorganic composition of the wastes might be, and what effect, if any, such wastes and by-products may have upon the surrounding area, including groundwater.

Response: The nonradioactive waste that will be generated at the Midland Plant will be no different than for fossil electric plants. These wastes will consist of packaging materials such as paper, wood, plastics, paper materials as used in any office function, junk and light metal containers that have no recoverable value. Applicant anticipates a conservative discharge volume of one cubic yard a day.

The disposal of Midland Plant nonradioactive solid waste will be disposed of independently of Dow Chemical Company. The landfill projects which might be used are sanctioned, regulated and licensed by the Michigan Public Health Department. The disposal of nonradioactive solid waste from the Midland Plant will be by a licensed waste disposal company. No arrangements have been made with a specific company at this time. One company which serves the Midland area is Hartley and Hartley of Bay City. Hartley and Hartley operates a licensed landfill at 2370 South Two Mile Road in Bay County. This landfill has at least a 25-year capacity.

14. and 15. (Contd)

The metal materials will be salvaged and sold to a scrap dealer. It is difficult to evaluate the quantity because in a nuclear plant you have very little materials that need replacement as compared to a conventional plant where you have coal grinding and handling equipment and fly ash equipment. Other nonradioactive materials that will require disposal, but of a very limited and difficult quantity to evaluate, will be make-up demineralizer resins, filters, and replacement parts for various Plant equipment.

16. Sanitary waste products created by operation of the Plant are planned to be shipped to Dow Chemical or Dow Corning facilities for treatment or disposal. There is no explanation, discussion, or description of the manner by which such sanitary wastes will be shipped to Dow or the manner by which Dow will dispose of such wastes. Thus, a complete analysis of the effect of sanitary wastes of the Plant must include an analysis of Dow Chemical and Dow Corning sanitary waste systems. Without such a discussion, relative cost-benefit and risk-benefit analyses cannot be made.

Response: Sanitary wastes from the nuclear plant will be sent to the Dow facilities through a pipeline where it will be treated in the Dow waste treatment system. These wastes will be only a very small fraction of one percent of the capacity of the Dow waste treatment plant, the discharge of which will comply with the agreement set forth in the response to Contention No 9.

17. Environmental submissions by Applicant and Regulatory Staff have failed completely to discuss or analyze the absolute and incremental effects upon the environment (including cost-benefit and risk-benefit considerations) of the entire uranium fuel cycle, including the production of uranium by means and methods not presently developed, such as, for example, the Liquid Fast Metal Breeder Reactor ("Breeder"). A great deal is presently unknown by the Atomic Energy Commission, and vendors and utilities in the nuclear industry concerning the effects of an increased surge in nuclear development and use of uranium upon the environment. Below in this section, we set forth considerations known to us at this point, which must be the subject of an environmental analysis, and without which, a full and complete analysis cannot be made.

18. The Plant will cause, absolutely and incrementally, environmental damage and adverse effects, known to man, from the mining of the uranium, which will be necessary in order to supply fuel for the Plant. It is contended that strip-mining of uranium necessary for fuel for the Plant will without adequate benefits, represent an unwarranted environmental cost to the environment. Additionally, uranium tailings will be produced as a by-product as a result of strip-mining or any other mining of uranium. The disposition of such tailings and its effect upon man and his environment have not been considered. Moreover, during the mining of uranium, many radionuclides are produced such as, for example, radon. These radionuclides are lethal or sub-lethal; and, thus, contribute to the death of man and other organisms and will contribute to long-term contamination of particular geographic areas, making them essentially useless for any alternative purpose. Thus, we contend that this segment of the uranium fuel cycle must not only be discussed in depth, but must also be quantified in any cost-benefit consideration to determine whether the resultant costs and risks (which are incrementally and absolutely created as a result of the proposed Plant) are outweighed by any alleged or asserted benefits.

19. After uranium is mined, the ore must be shipped for milling and processing into yellow cake as the next step in the production of nuclear fuel. Once again, there is absolutely no discussion or consideration of this segment of the fuel cycle, what adverse environmental effects may occur, and whether the costs and risks are outweighed by alleged or asserted benefits. After uranium is fabricated into yellow cake, it must be further processed into a form of ceramic pellet, which pellets ultimately become a part of the nuclear fuel rod itself (Uranium 235 and Uranium 238). Thereafter, the fuel rods are distributed for use in nuclear power plants and for use in the proposed Plant. There is no discussion of the consequences or adverse effects associated with the reprocessing of yellow cake ultimately into fuel rods, nor is there any discussion or analysis of the costs and risks associated therewith, and whether they are outweighed by any asserted or alleged benefits.

20. Subsequent to the use of fuel rods at the proposed Plant, high and low level radioactive waste products will be generated. High level radioactive wastes from irradiated fuel will be transferred, presumably to a reprocessing center, for separation of plutonium and uranium. Uranium 235, uranium 238, and plutonium presumably will be used once again to create nuclear fuel. However, the major portion of the high level radioactive wastes, which are not uranium or plutonium, then must be disposed of and stored for substantial periods of time. There is no discussion at all of where such high level radioactive wastes will be stored and what incremental burden will be placed upon storage facilities and their surrounding environment as a result of high level radioactive wastes from the proposed Plant. Indeed, the Atomic Energy Commission has, at present, no site selected for the disposition of such high level wastes; and, therefore, as a matter of law, there has not been any cost-benefit or risk-benefit analyses of the disposition of such high-level wastes with respect to asserted or alleged benefits. Intervenors contend that the disposal of such high level radioactive wastes create risks and costs to the environment and result in adverse environmental effects in terms of radiation exposure, which far outweigh any additional benefit, if any, to the electric consumer which may occur as a result of operation of the proposed Plant.

21. During the reprocessing aspect of the uranium fuel cycle, and in addition to radiation hazards connected therewith, there are additional and adverse environmental effects. Current reprocessing plants are fueled by conventional means and in most cases, are fueled by high sulfur coal. The reprocessing plants themselves, in the production of uranium for use at the proposed Plant, adversely affect the environment by emitting particulate matter, sulfur dioxide, oxides of nitrogen, and miscellaneous other noxious substances. Thus, the very production of reprocessed fuel, for so-called clean nuclear power, creates conventional pollutants which are emitted to the atmosphere. There is no discussion, for example, as to whether such conventional pollutants emitted by reprocessing plants in the course of reprocessing fuel would create more costs and risks to the environment than similar conventional pollutants which might be emitted if the proposed Plant were a conventional power plant.

22. In addition to conventional pollutants, reprocessing plants release, in normal operations, radioactivity in gaseous and liquid forms. There is no discussion of the amounts, character, and effects of such radioactive emissions; and since the Atomic Energy Commission does not apply either Part 20 Standards or the as low as practicable formula to reprocessing plants, it is conceivable that the total amount of radioactive emissions which will reach the environment as a result of the operation of the proposed Plant will exceed safe and tolerable limits. In addition, incremental radioactive releases from reprocessing plants created by virtue of the production of reprocessed fuel for the proposed Plant will be absolutely increased.

23. Environmental submissions by Applicant and the Regulatory Staff admit that low-level solid and liquid radioactive wastes will be generated by operation of the proposed Plant. There is an inadequate discussion of the character or environmental effects of such radioactive wastes; and (in the sense that each radionuclide is not listed either quantitively or qualitively), no discussion of the incremental burden on the environment which will be created by such wastes from operation of the proposed Plant. In addition, neither Applicant nor the Atomic Energy Commission has considered fully where such wastes will be transported and stored; accordingly, as a matter of law, there has been no consideration as to whether costs and risks created thereby will be outweighed by alleged or asserted benefits. Indeed, there is no discussion or assurance that adequate facilities for storage and disposal of low-level radioactive wastes incrementally created by the proposed Plant will be available, considering the amount of low-level radioactive wastes generated and available for disposition and storage by nuclear power plants in operation and planned to be in operation during the life of the proposed Plant.

Response: Contentions 17-23 relate to the uranium fuel cycle prior to shipment of new fuel to the plant, subsequent to shipment of spent fuel from the plant or subsequent to shipment of low-level and high-level wastes from the plant. At present, the Board has indicated that it intends to rule that this area is not to be considered in this proceeding and has indicated its intent to certify such ruling to the Commission. These contentions are therefore out of order at this time.

24. Uranium, as a source of fuel, is in low supply. Applicant and the Regulatory Staff have failed to discuss whether sufficient uranium ore will be available to provide nuclear fuel for the proposed Plant, considering the amount of uranium ore which will be necessary to provide nuclear fuel for other reactors which will be in operation during the life of the proposed Plant. The Atomic Energy Commission has recently announced intentions to construct and develop a Breeder in order to provide further assurance that nuclear fuel will be available for the proposed Plant and other power plants which may be in operation during the life of the proposed Plant. The Breeder presents significant and unresolved safety, scientific, and environmental problems. Neither the Atomic Energy Commission nor the nuclear industry fully understand the risks and costs involved in the construction and operation of Breeders. Since the proposed Plant may rely upon nuclear fuel created by a Breeder, the risks and costs of the development and operation of Breeders must be analyzed against any alleged or asserted benefits, if any, that may be gained by construction and operation of the proposed Plant.

Response: Applicant made a detailed discussion of the uranium fuel supply situation in §5.2.3.5 of the ASER. As stated therein, most projections of uranium availability are based on United States reserves recoverable at certain prices per ton. As further stated therein, if reserves recoverable at higher prices and foreign reserves are taken into account, Applicant believes adequate fuel supplies will be available without reliance on plutonium recovery or Breeder reactor development. Either of these latter developments would of course improve the reserve picture. The Breeder reactor is not at issue in this proceeding and the contentions thereon should be disallowed.

25. If the proposed Plant is constructed, it will have a defined, useful life. At the completion of its defined, useful life, something will have to be done with the Plant and all its radioactive components. Neither the Atomic Energy Commission nor the Applicant have addressed themselves to the economic, environmental, and social costs connected with decommissioning of the proposed Plant. In addition to the failure to have discussed the issue of decommissioning of the proposed Plant, neither Applicant nor the Atomic Energy Commission have any idea as to how they will decommission the proposed Plant, what consequences will result therefrom, what economic costs will be incurred, and what effect decommissioning will have upon the development of the greater Tri-City area and the health and safety of the surrounding environment, including man and all other organisms. Unless the issue of decommissioning is adequately resolved, an appropriate analysis of risks and benefits associated with construction and operation of the proposed Plant cannot be made.

Response: The Intervenors' contention that "neither applicant nor the AEC have any idea as to how they will decommission the proposed plant," is not founded on facts. It should be pointed out to the Intervenors that several nuclear power plants have already been decommissioned. The following is a partial list of such power facilities:

1. Hallam Nuclear Power Facility
2. Carolinas Virginia Tube Reactor (CVTR)
3. Boiling Nuclear Superheater (BONUS) Power Station
4. Pathfinder Reactor
5. Piqua Reactor

The above should indicate to the Intervenors that technology is presently available for decommissioning nuclear reactors. However, for the proposed Midland facilities, it is not necessary to discuss in detail the methods by which the Plant would be decommissioned. It is anticipated that the technology will advance at a rapid rate in the next 40 years and what may not be economically feasible today, may become economically attractive at

25. (Contd)

that period of time. The decommissioning of the several nuclear power plants has proved that it is economically feasible and a completely safe procedure to decommission a nuclear reactor. The health and safety of the surrounding environment is not endangered by decommissioning of a nuclear power plant. The exact procedures and methods for decommissioning the Plant and the cost of decommissioning is not relevant to the cost benefit analysis of this Plant. It should be understood that the cost of decommissioning the Plant is small compared to the cost of building and operating the Plant. Since the cost of decommissioning the Plant will occur 40 years after the start of operation of this Plant, the present worth of the cost of decommissioning the Plant would be extremely small as compared to the cost of the construction of the Plant. For example, the present worth of $100 to be spent 40 years hence is $4.60 using an 8% discount rate as used in the benefit cost analysis (ASER, Pages 5.1-11, et seq).

The decommissioning procedure will require the surrender of the facility license under 10CFR 50.82 and dismantling and disposal of component parts to be made in accordance with the requirements of the applicable AEC regulations. Should it be decided that certain radioactive components be left at the site, then it would be necessary to receive an amendment to the facility license to provide for the ownership and possession, but not operation of, the reactor and certain components such as heat exchangers, piping, valves, pumps, etc. The "possession only" license would then require surveillance and security of the area for several years to follow.

The decommissioning of the Plant would require essentially the following:

1. Remove all fuel from the site.
2. Remove all radioactive waste from the site.

25. (Contd)

3. Decontaminate by chemical cleaning and flushing the various components, piping, etc, and remove the radioactive and chemical wastes from the site.
4. Isolate the Nuclear Steam Supply (NSS) system by capping and sealing all pipes and pipeways. Seal all building openings. Provide permanent barrier against access from any outside area. Provide a barrier around the enclosed NSS systems. As an alternative, construction of an entombment over the NSS system may be considered.
5. As an alternative to Item 4 above, all components of the NSS system may be removed from the buildings. Those components that cannot be decontaminated will need to be either buried at site with proper protection, surveillance and license arrangements or shipped offsite for ultimate burial. All buildings may then be demolished and the site returned to commercial or farm use.

The order of magnitude cost evaluation of the Steps No 1 through 4 of the decommissioning program described above is $35,000,000 on the basis of present day costs. This includes the estimated cost of filling the cooling pond, grading the total site and returning that portion of the site containing the pond to uses permitted by the then current zoning (see Findings and Order, Page 102, AEC February 10, 1971, Draft Detailed Statement).

26. Throughout the Uranium Fuel Cycle, including in a more general sense the proposed development of the Breeder and the decommissioning of the proposed Plant, accidents may occur in the transporting and handling of radioactive material. Accidents may result from negligence or intentional acts, such as sabotage. There exists no meaningful discussion by either Applicant or the Regulatory Staff as to the character of such accidents, ways in which they will be prevented, adverse or beneficial consequences from such accidents, and the economic and other environmental costs associated therewith. To the extent that such accidents increase the total amount of radioactivity emitted to the environment, they represent a consideration for additional costs and risks which must be judged against the alleged or asserted benefits from the proposed Plant.

Response: Applicant in Section 4.5 of the ASER and the Staff in Section VI.B of the Draft Detailed Statement did discuss the transportation of new fuel to the site, spent fuel from the site and high- and low-level wastes from the site. Transportation before or after the discussed transportation is not appropriate for the reasons stated in response to Contentions 17-23 above. To put this issue in perspective, it is interesting to note that:

> "In 1971, the AEC completed its 25th year of radiation injury free experience in the transportation of radioactive materials." Annual Report to Congress of Atomic Energy Commission, January 31, 1972, p 8.

27. Throughout the Uranium Fuel Cycle, including in a more general sense the proposed development of the Breeder and the decommissioning of the proposed Plant, various amounts of radioactivity in differing character will be released to the environment. Since such radioactivity, by definition, does not dissipate immediately, it tends to build up in the environment and various of its component parts, including man and other organisms and water. Since component parts of the environment tend to concentrate or biologically magnify radiation, the total amount of radiation which could affect man and other organisms is underestimated by Applicant and the Regulatory Staff. Accordingly, both short- and long-term risks and costs associated with such magnified radiation have not adequately been assessed in light of presumed or asserted benefits. Biological magnification or concentration occurs in various ways. Thus, for example, radioactive material which is deposited on plant life or soil will ultimately reach water and the organisms contained therein and the organisms depending on that water for their sustenance. Because of biological magnification and concentration, radioactivity originally deposited on the soil and plants will have a far greater adverse effect when man and other organisms are exposed to or ingest such radioactivity at the end of the aforesaid cycle. In addition, there is biological magnification or concentration of radioactivity in food chain cycles, which begin directly by the discharge of radioactivity to water.

Response: To the extent this contention relates to portions of the fuel cycle not in issue in this proceeding, it is inappropriate for the reasons stated in reply to Contentions 17-23 above. To the extent the contention is intended as an attack on 10 CFR Part 20 it comes too late. In any event, Applicant in calculating doses in Section 4.2 of the ASER considered all significant releases, both to the air and to the water, and took into account all significant biological concentration mechanisms.

Buildup of radioactivity in vegetation and soil by deposition cannot result from the releases of noble gases from the Plant, and, therefore, would be limited to the possible Iodine 131 (I-131) releases described. Assuming this iodine release, a dairy herd at the site boundary and a biological concentration factor of 700, the I-131 would be undetectable in the milk by ordinary analytical methods. Since there are no established dairy herds within five miles of the Plant, there was no dose calculated from this avenue of exposure. This contention contains no facts to support it.

28. Applicant and the Regulatory Staff have struck an erroneous balance between the benefits, if any, to be derived from the proposed Plant and the risks and costs involved in the consequences of a postulated loss of coolant accident resulting in an uncontrolled meltdown. Because of the inadequate experimental and other data which underlies the opinions and conclusions of Applicant and the Regulatory Staff regarding the effectiveness of the Emergency Core Cooling System and the so-called Interim Criteria concerning such System and because alternative and safer methods of producing electricity are available, the proposed Plant results in an intentional infliction of risks and costs upon the public and a violation of the Atomic Energy Act and the National Environmental Policy Act. Intervenors hereby incorporate by reference the substantive contentions in the Petition to Participate filed in Docket RM 50-1 on behalf of the National Coalition of Intervenors. That Petition to Participate sets forth specific contentions respecting the inadequate basis of the Interim Criteria and Applicant's Emergency Core Cooling System, and Intervenors here urge the same contentions in order to challenge the erroneousness of the resolution of the related cost-benefit analysis.

Response: This contention is essentially a radiological health and safety issue which will be determined in the portion of the hearing dealing with the emergency core cooling system. If the results of that portion of the hearing differ from the conclusions of the Applicant and Regulatory Staff presently in the record as to the type accident to be considered, the Board may well choose to include such different conclusions in its environmental evaluation.

29. There are no benefits to be derived from operation of the proposed Plant, and, alternatively, all risks and costs greatly outweigh any alleged or asserted benefits.

30. Intervenors contend that there is no valid benefit at all in connection with the proposed Plant. Applicant and Regulatory Staff analyses of the alleged benefits are found respectively at Pages 5.1-1 through 5.1-4 of Volume 1 of Applicant's Supplemental Environmental Report and the bottom half of Page 125 and the first paragraph of Page 126 of the Regulatory Staff's Draft Detailed Statement. Aside from the fact that these discussions are an insult to intelligence, they clearly demonstrate that there are no benefits to be derived from the operation of the proposed Plant.

Response: Contentions 29-30 are general conclusions totally lacking in substance and unsupported by facts. As such, they fail to meet the AEC requirement that contentions be specific.

31. The additional electricity available from the proposed Plant is not a benefit. Additional electric generation through nuclear power merely creates risks and costs to the environment. Moreover, at a time when our alleged energy demands are increasing, it is not beneficial to continue to add to the production of electricity without increasing our understanding how any demand for electricity is created. And, thus, to the extent that electricity demand is created by virtue of promotional activities or other such efforts of Applicant and the Atomic Energy Commission, any increase of electricity is not a benefit, but an unwarranted cost to the environment. Applicant, other utilities, the Atomic Energy Commission, the Federal Power Commission and the nuclear industry have created an artificial demand for electricity, and no environmental analysis should reward such efforts.

32. Neither Applicant nor the Regulatory Staff has considered the possibility of changing the present social stimuli to society which could result in decreased demand for electricity, thereby not requiring the production of electricity from the proposed Plant. Elsewhere in this statement, we will set forth more specifically our contentions with respect to Applicant's projected load forecasts which we believe are invalid and in some instances untrue.

Response: Contentions 31-32 are patently frivolous and should be stricken.

53. Applicant and Regulatory Staff assert that the proposed Plant would create a benefit resulting from shutting down Dow Chemical's fossil fired facilities. There is no serious analysis, however, as to whether Dow Chemical can purchase power from other of Applicant's generating facilities, or whether indeed, in the long run, it would be less costly to the environment to require Dow Chemical to retrofit or update its facilities to provide for fossil fuel generation of electricity without resultant pollutants. In the long run, it would make more sense to require Dow Chemical and others (by denying electricity from the proposed Plant) to investigate ways and means of generating electricity through conventional means or other means not now known to man which could result in less risks and costs than the generation of electricity through nuclear power plants. The assertion that the generation of electricity from the proposed Plant is a benefit because it shuts down fossil fired plants is in reality trading one risk for another. Thus, before such a conclusion is sound, one must evaluate the effects of pollutants from conventional power sources against the effects of normal and abnormal releases of radiation. Since Dow Chemical has been polluting Midland for several decades with its fossil fired facilities, sufficient information should be available to determine what the effects have been and then one could compare them with known effects of radiation upon man and the environment.

52. Even considering the generation of any needed electricity by a fossil fired plant without additional pollution abatement facilities, harmful and adverse effects and dangers from radiation greatly outweigh any harmful and adverse effects from pollution which may be emitted from a fossil fired plant. This is because radiation effects are long-term in contrast to effects of conventional pollutants, because radiation effects cover a broader geographical area than do effects of pollutants from a given fossil fired plant, because available safety measures are more sophisticated and more reliable in fossil fired plants, and because a fossil fired plant is more reliable in terms of maintenance and forced outages. Accordingly, the selection of the proposed Plant imposes an unwarranted cost upon the environment.

Response: It is clearly the opinion of the Michigan Department of Public Health that the Midland Plant is preferable to retaining the Dow power facilities. They have offered statements in support of the Midland Plant while the Dow plants are operating under variances from the Michigan Air Pollution Control Commission. The radioactivity releases from the Plant are so negligible as to be undetectable beyond the site boundary and are well within all recognized and proposed standards. There is no

33. and 52. (Contd)

evidence whatsoever that releases at such low levels and of such composition could produce any significant adverse effects. Releases from the Dow fossil-fired units on the other hand clearly exceed recognized standards promulgated to protect the public health and safety and as pointed out by the Michigan Air Pollution Control Commission, cause a greater radioactive dose to the public than will the nuclear plant.

Dow will purchase electrical power from the Applicant's integrated system not from the proposed plant alone. Applicant has set forth in the ASER, Sections 5.1 and 5.2, the environmental and economic advantages of the proposed plant. These advantages apply equally to facilities constructed by Dow and/or the Applicant for the purpose of steam and/or electric generation. It is ludicrous to propose that present energy needs or energy needs arising in the short-term foreseeable future be met by "means not now known to man." No facts have been set forth by intervenors to justify this contention.

34. Applicant and the Regulatory Staff assert that the proposed Plant will provide economic growth for the Midland Community and enable Dow Chemical to expand its facilities by virtue of having available to it low cost energy. There is no discussion, however, as to whether the Midland Community should encourage expanding industry or whether other uses should be found for the land and resources which will be required in such expansion. Moreover, since Dow Chemical presently has available to it in its organization areas, admittedly low cost energy areas, within which it could expand, there must be an analysis of the environmental effects of the Dow Chemical expanding in Midland as opposed to elsewhere in order to justify the suggestion that Dow Chemical's expansion is a benefit. Finally, in any such analysis, if it is determined that the character and type of the Dow Chemical expansion will result in undesirable products, such as, for example, the creation of chlorinated hydrocarbons or 2-4-5-T, then the subsidization of Dow Chemical by virtue of the construction and operation of the proposed Plant results in additional costs to the environment without any concurrent benefits.

Response: This contention is similar to the subsequent contentions that it is necessary to examine into the uses to be made of the product by each of the customers, the social values of such uses and the alternatives to such uses. As Intervenors are well aware, such a project would take many, many years of work by large numbers of people. It is a task which cannot hope to be accomplished meaningfully in a Plant licensing proceeding. For this reason and for the other reasons stated in response to similar contentions, this contention should be stricken.

35. Most of the employment asserted to occur as a result of the construction of the proposed Plant is short-termed in duration. No analysis has been made as to whether it would be more sound to arrange permanent employment of the so-called peak labor force of 700 men which allegedly will be used during construction rather than spend millions of dollars in the construction of the Plant for a two or three year employment of 700 men. There will be no significant increase in employment of Dow Chemical as a result of any expansion of its facilities, which may occur as a result of the construction of the proposed Plant; and, in fact, Intervenors contend that the expansion of the Dow facilities will result in a decrease of employment in the Midland Community.

Response: The first sentence is admitted. Because of the nature of the construction industry, almost all employment is short term and applicant is not in a position to require that the contractors in the United States carry permanent work forces whether they have any project or not. This first contention is patently frivolous and should be stricken. For the reasons stated in response to Contention 34, the contention as to Dow should be stricken.

36. Applicant and Regulatory Staff assert that a benefit from the proposed Plant will be additional revenues and taxes. This is a specious argument and clearly is not a benefit entitled to consideration in a NEPA review, since revenues and taxes may flow from undesirable as well as desirable ventures vis-a-vis the environment. Additional taxes and revenues could be generated by proposing higher taxes on existing generating facilities which contribute to pollution and by imposing severe fines on Dow Chemical and Dow Corning for having polluted Midland and other areas of the United States for several decades.

Response: The benefit from the plant is the electricity produced. This benefit is equal for all alternatives which produce the same quantity of electricity. Revenues were used as a monetary quantification of these benefits, being the amount that people are actually paying for the electricity. Property taxes are a benefit to the local economy. Saginaw Intervenors contend that these are not benefits based on their argument that because benefits arise from a project which they consider undesirable one should only consider the costs and not the benefits. This is clearly contrary to the whole purpose of benefit-cost analysis. This contention is clearly frivolous, lacking in specificity, unsupported by facts and without merit.

37. Because available statistics demonstrate that nuclear power plants suffer as compared to fossil fired plants, more forced outages for reasons of maintenance, unreliability, and inadequate research, the construction of a nuclear power plant as a base load or peaking load generating facility actually results in inefficient generation of electricity and, accordingly, costs and risks to the environment and not benefits.

84. Applicant and the Regulatory Staff have in part asserted a need for power from the proposed Plant in order to retire older, less efficient, fossil fired plants. However, Applicant has failed adequately to compare the reliability of fossil fired plants with the reliability of nuclear power plants and the proposed Plant.

Response: The reliability of pressurized water reactor (PWR) nuclear plants, similar to the type that will be installed at the Midland Plant, is very comparable to fossil plants. The average plant availability is approximately 86% for the nuclear plants within the 400-575 MWe rating and 86% for the fossil plants. This data was obtained from a paper presented at the 1971 Electric Utility Engineering Conference on March 14-26, 1971. The data used for comparison was selected on a comparable basis, that is, there was no abnormal maintenance performed on any of the selected units.

Table 37 is attached which lists those units selected from the previous mentioned paper plus the up-to-date data for 1971. This table also includes the availability for three of Applicant's largest and newest coal-fired units, excluding its largest unit which had abnormal maintenance.

Applicant concludes that a nuclear plant as designed for the Midland Plant is reliable and is comparable to fossil fuel plants used for base load. These contentions set forth no facts in their support and are lacking in specificity.

TABLE 37

PWR PLANT AVAILABILITY

Name	Period	Rating MWe (Gross)	Average Plant Availability
San Onofre	69-70	430	82 %*
	1971		93 %
R. E. Ginna	1970	420	85 %
	1971		76 %
Point Beach	1971	497	88.3%
Conn Yankee	69-70	575	86 %*
	1971		86 %
H. G. Robinson	4 months 1971	700	92 %

FOSSIL PLANT AVAILABILITY

Fossil**	1960-1969	130-199 MWe	92 %
	"	399-599 MWe	85 %
	"	600 MWe	84 %
CP Co (3 Units)	1971	275 MWe	86.8%

*Includes refueling
**Includes annual overhaul

Note: Pwr and Fossil data for 69-70 and 60-69 data was from the 1971 Electric Utility Engineering Conference.

38. The proliferation of nuclear power plants and the construction of the proposed Plant will deter research and development into more sophisticated pollution controls for fossil fuel plants, into nuclear safety, in alternative methods of generating electricity, into an analysis of utilities' assertions as to rising demands for electricity and will deter exploration for gas, coal and other fossil fuels. Finally, construction of the proposed plan will further encourage a commitment to nuclear power and the Breeder at a time when there are substantial unresolved areas of scientific and environmental concern.

Response: This contention is patently frivolous and should be stricken.

38A. Applicant has asserted, as stated above, that one of the benefits emanating from the proposed Plant will be the elimination of fossil fired generating capacity both in Applicant's system and in other generating facilities such as Dow Chemical. Assuming the validity of this statement, in order adequately assess the full nature of any alleged benefit, it is important to consider whether the proposed Plant will assist in reducing fossil fired generating facilities of other than Applicant and Dow. Thus, for example, there are generating municipalities and municipal power pools (consumer rather than investor owned) which have demanded purchase from or access to electricity to be generated from the proposed Plant. Assuming the validity of Applicant's and the Regulatory Staff's contention in this area, it is necessary to analyze whether the Plant is suitably sited and sized in order to spread any alleged benefit throughout the relevant franchise area. The municipalities and consumer owned electrical cooperatives whose needs should be considered in such an analysis include Coldwater, Michigan, Holland, Michigan, Traverse City, Michigan, Grand Haven, Michigan, Zeeland, Michigan, the Northern Michigan Electric Cooperative, and the Wolverine Electric Cooperation. These municipalities and cooperatives have a justifiable interest in purchasing from or access to electricity from the proposed Plant, assuming the validity of Applicant's contention with respect to alleged benefits.

38B. One or more of the above municipalities and cooperatives are so situated so that interconnections could take place between each or all of them and Applicant granting them access to electricity from the proposed Plant, to electricity from Applicant's existing generating facilities and to transmission lines existing or to be built in connection with Applicant's generating of electricity. An adequate environmental analysis of costs and benefits must include the environmental impact which may occur as a result of Applicant's failure to or agreement to provide access to such municipalities and cooperatives to electricity from the proposed Plant and from Applicant's existing generating facilities (including its interconnection partners in the Michigan Power Pool and the ECAR Region) as well as access to transmission lines existing or to be built by Applicant. Thus, the validity of any alleged benefit is a function of that benefit's availability to all coordinating utilities in the relevant area. Intervenors contend that Applicant's illegal policies regarding the sale of electricity, the sharing of generating facilities, and the nonavailability of its transmission lines has or could result in adverse environmental impact as a result of other coordinating utilities not having an available input into Applicant's huge and monopolistic position in the greater Michigan area.

38A. and 38B. (Contd)

Response: Applicant has never refused to provide electricity from its system to the various systems listed in these contentions, and is in fact directly or indirectly connected with all of them. All of these systems have access directly or indirectly to Applicant's existing generating facilities through wholesale or interconnecting agreements with the Applicant, or agreement between themselves, and could expect such access on a similar basis to the Applicant's future generating facilities. The legality of the manner in which Applicant provides such electricity is a matter being resolved in the antitrust proceeding before an Atomic Energy Commission board and is not an issue in this proceeding. These contentions should therefore be stricken.

39. Beginning from the time of initial development of civilian uses of nuclear power to the present, the Atomic Energy Commission, utilities, and the nuclear industry have underestimated, misreported, and misrepresented the safety, environmental impact, and reliability of nuclear power plants for the generation of electricity. Nuclear power plants were constructed and built without respect to the environment until the Atomic Energy Commission amended its illegal policy regarding environmental protection. During this period of time, the Atomic Energy Commission, utilities, and the nuclear industry were actively engaged in the promotion of nuclear power, without respect to criteria and standards necessary for the health and safety of the public and their environmental protection. Significant safety programs such as the Loss of Fluid Test ("LOFT"), although admittedly necessary to analyze the safety of emergency systems, have not been completed. Thus, despite the fact that the Atomic Energy Commission has admitted that its prior conservative assumptions with respect to safety have not provided reasonable assurance of margins of safety, the Atomic Energy Commission, utilities, and the nuclear industry continue to press for nuclear power plants, content to await necessary safety and environmental research after substantial commitments of resources have been made. The aforesaid and illegal promotional program is intended to subject the general public and persons living within the Tri-City area to the risks of nuclear power plants without sufficient analysis of available alternatives. The program is intended to create a fait accompli prior to any meaningful analysis.

Response: This contention is clearly frivolous, unsupported by fact and without merit. It should therefore be stricken.

40. All of the risks associated with nuclear power, including scientific, safety, and environmental risks with respect to the proposed Plant, have not been explained or released or made available to the public so as to provide a foundation for a cost or risk-benefit analysis. Since the consequences of a loss of coolant or a more severe accident are far greater than the consequences of an accident from a conventional power plant, such risks must be evaluated in light of the relevant benefits, if any, resulting from the construction of a nuclear or fossil fired generating facility.

Response: Both the ASER, Section 4.2, and the Staff Draft Detailed Statement, Section VI, discuss the results of all credible accidents except those with the very smallest probability. The consequences of such accidents are evaluated in the context of the benefit-cost analysis. If the radioactive health and safety portion of the hearing indicates that a more severe accident has a probability of occurrence on the order of those accidents evaluated, the consequences of such an accident would be taken into account in the environmental evaluation. At present, there has been no indication in the health and safety portion of the hearing that severer accidents than postulated have other than an infinitesimal probability of occurrence. This contention contains no facts to support it and is lacking in specificity.

41. As of January 1, 1972, there were a total of 23 nuclear generating units in operation. These reactors are primarily of an older generation and have a Mw size smaller than the size of the reactors presently planned to be constructed generally as well as the proposed Plant. There has not only been a lack of experience with respect to reactors the size of the proposed Plant, there has also been no experimental data or significant experience with reactors the size of the proposed Plant or larger. The Atomic Energy Commission's safety program with respect to light water-cooled reactors has been insufficient and devoid of regulatory responsibility. The so-called safety program has been geared to promotion and agrandizement of power by an administrative agency without regard to the public health and safety.

Response: Each Midland unit is rated 2452 MWt with an equivalent electrical generation of approximately 825 MWe. The present generation of nuclear power plants operate at 2200 MWt and there will be plants operating at 3300 MWt before the Midland units go into operation.

The B&W Company will have approximately ten (10) operating units similar to the Midland Plant in service before Midland Unit One comes on-stream. The Palisades unit which is rated for 2540 and licensed for 2200 MWt has already successfully operated at 20% of power and will have operated five years at 100% power before the Midland Unit One becomes commercial.

There are no facts set forth to support this contention.

42. The result of substantial commitments of resources prior to analysis of safety and environmental problems has been to encourage the Atomic Energy Commission and others to ignore and avoid a complete analysis of alternative methods for the generating of electricity. This is because the Atomic Energy Commission is a single purpose agency uninterested in sponsoring for any reason the construction of other than nuclear power plants. Accordingly, all analyses by the Regulatory Staff have been biased and nonobjective; for example, to date, the Regulatory Staff has not, with respect to any license application, recommended the construction of other than a nuclear power plant. It is inconceivable that an unbiased and objective analysis would not produce at least one instance where other than a nuclear power plant was suggested for construction.

43. As a further evidence of their promotional efforts, the Regulatory Staff and Applicant have failed with respect to the proposed Plant to make a sincere analysis of alternative methods for generating electricity; the Regulatory Staff has not performed any independent inquiry but rather has adopted, uncritically, the position tendered by the Applicant. Thus, inquiries into alternatives have been shortsighted, misrepresented, and, in instances, intentionally colored.

Response: Applicant has fully explored alternate means of generation and has presented the results of this exploration in the ASER, Section 5.2. The remainder of these contentions are completely frivolous and conclusionary. There is no factual basis for these contentions and it is lacking in requisite specificity.

43. (See Contention 42.)

44. A threshold inquiry into the alternatives to the generation of electricity from the proposed Plant is whether additional electrical generation from Applicant is necessary from the proposed Plant in light of all of the relevant circumstances. To the extent that this contention also reflects a need for analysis of the alleged need for power, we incorporate here by reference that section of these Contentions dealing with the need for power. Additionally, and notwithstanding assertions of need for power, a full and complete analysis of alternatives must include a consideration of all other power available to Applicant from its own system, from utilities from which it is currently purchasing power, and from utilities from which it could purchase power by virtue of contractual or interconnecting commitments.

Response: Applicant in the ASER, §§2.0, 5.2, 5.3 and 5.4, has demonstrated that additional electric generation is necessary, that the Plant is the best available alternative for providing this generation and power from other systems is not as reliable, economic or environmentally desirable.

45. Intervenors contend that there is no need for electricity from the proposed Plant in light of the short and long-term plans of Applicant to build additional facilities. Thus, electricity from the proposed Plant is unnecessary and results in an unwarranted cost to the environment.

Response: This contention is unsupported by facts and totally without merit as has been shown in the ASER, Section 2. There are no facts set forth to support this contention and it is insufficiently specific.

46. Applicant, without construction of the proposed Plant, will be able to meet its valid demands for the generation of electricity by virtue of purchasing power from one or more of the following sources: (a) Power Pools and Regional Associations of which Applicant is a member; (b) Power Pools and Regional Associations of which Applicant is not a member but which it could join; (c) Making contractual arrangements for firm commitments for power resulting in a guaranteed source of supply, rather than making no commitments and relying upon future availability; (d) From other than investor owned utilities, having different peak periods than Applicant, with whom Applicant could interconnect on a national or international basis; and (e) From investor owned utilities having different peak periods than Applicant with whom Applicant could interconnect on a national or international basis. In any analysis of the various alternatives available to Applicant (instead of electricity alleged necessary from the proposed Plant), Intervenors contend that all of the long-term construction plans of every available source of power must be considered. In other words, in order to ascertain what sources of power or alternatives are available to Applicant, one must analyze and consider the short and long-term construction program of every available source of power in the United States and Canada. Intervenors contend that an analysis of available sources of power, even assuming a need for power, will demonstrate that the proposed Plant results in an unwarranted cost to the environment.

Response: As Applicant has stated in the ASER, Section 5.3, firm power in the magnitude necessary is not available from sources described in this contention. Temporary emergency power in varying amounts may be available from some of these sources. As pointed out in the ASER even if Applicant could induce some other utility to build a generating plant for Applicant's benefit such a course of action would not be as reliable as the proposed course of action, would have no environmental advantages, would have environmental disadvantages and would have economic disadvantages. Intervenors' initial contention is unsupported by fact and is insufficiently specific. The concluding contention of Intervenors, in addition to suffering from the same defects as the initial contention, is also clearly frivolous.

47. Intervenors contend that Applicant and the Regulatory Staff have been engaged in promotional efforts to create a false demand for electricity; and all of the electricity to be generated from the proposed Plant is, therefore, not necessary for Applicant's franchised area. Accordingly, the construction and operation of the proposed Plant will not provide any benefit to electrical users and the proposed Plant represents an unwarranted cost to the environment. Intervenors further contend that Applicant, by virtue of advertising campaigns directed toward further use of electricity during peak periods, as well as advertising campaigns deficient in explaining to users in its franchised area methods of decreasing peak period use of electricity, have contributed in whole or in part to the demand for electricity from the proposed Plant; and accordingly, for this additional reason, the proposed Plant represents an unwarranted cost to the environment.

Response: Applicant denies that advertising creates a false demand, that any demand created by advertising is therefore of necessity not a benefit to the user and that the forecasted peak demand results in whole or in significant part from any advertising of Applicant. In any case, this contention is clearly frivolous and without merit. It speaks to a matter which is not a legitimate issue in this proceeding and fails to set forth any facts to support it. It should therefore be stricken.

48. Intervenors contend that the sole or primary motivating reason for the proposed Plant is an effort toward public subsidization of a private industry, to wit: Dow Chemical Company. Dow Chemical has available to it methods of purchasing or creating electricity and process steam, which would result in less cost to the environment than the purchase of electricity and process steam from the proposed Plant. Thus, Dow Chemical may retrofit and clean up its own facilities, it may purchase from other than Applicant, it may purchase from other of Applicant's generating facilities, and/or it may expand or move its facilities to other areas of the United States where low cost energy is already available. To the extent that the proposed Plant is to be constructed and operated in substantial part for the benefit of Dow Chemical Company, it represents an unwarranted cost to the environment.

Response: Dow has informed applicant that its reason for entering into an agreement for nuclear steam is that it is the lowest cost alternative in the Midland area. Dow is a responsible duly organized corporation and it is not the duty of the applicant nor of the AEC to probe into Dow's alternatives. As shown in the ASER, Page 5.2-4, the capital costs allocated to electric production will be such that electric power generated at this site will not be more costly than at any other site within the applicant's service area. The proposed Plant will therefore in no way be a form of public subsidization of private industry.

The contention is unsupported by facts, fails to set forth any facts in its support and does not deal with any issue in this proceeding and should be stricken.

49. Applicant and the Michigan Public Service Commission have illegally created an incentive for continual construction of generating facilities when they are unnecessary. The rate structure imposed upon Applicant by the Michigan Public Service Commission encourages Applicant to create unwarranted costs upon the environment. Because Applicant's ability to receive a fair return on its invested capital is directly related to outstanding amounts of unamortized construction and other capital costs, Applicant has an incentive to continue to construct power facilities, whether necessary or not, in order to maintain an artificially high rate structure. Specifically, Intervenors contend that Applicant is failing to use existing generating facilities to the extent of their useful lives and it is taking such facilities out of base load or peaking service after such facilities have been amortized and removed from consideration of Applicant's rate structure. Thus, the proposed Plant represents an attempt to construct a facility in order to maintain an artificially high rate structure and, as such, it represents an unwarranted cost to the environment.

Response: Applicant has clearly shown in Section 2.0 of the ASER that the electricity to be produced by the Midland Plant is necessary and that the percent reserve of the Michigan Pool will not be excessive. Additionally, Applicant has demonstrated the numerous economic and environmental reasons behind its choice of a nuclear plant. ASER Sections 5.1 and 5.2. Specifically, Applicant has shown in Section 5.2.1 that the nuclear alternative yields the lowest cost electricity.

Intervenors' contention that Applicant has an incentive to continue to construct power facilities, whether necessary or not, in order to maintain an artificially high rate structure is false. Due to regulatory lag and the difficulty in obtaining adequate rate relief, there is no incentive for Applicant to over invest in power facilities. Additionally, Applicant's rates are subject to review by the Michigan Public Service Commission and public hearings are held on all rate increases. This contention is clearly frivolous and unrelated to any matter at issue in this proceeding. Additionally, it sets forth no facts to support the contention.

50. Applicant and the Regulatory Staff have erroneously concluded that natural resources are unavailable in sufficient quantities to supply fuel for fossil fired power plants. To the contrary, uranium of all fuels is in the shortest supply and considering a rational exploitation of resources, Applicant - if it needs power - should be building other than a nuclear power plant. Intervenors contend that there are sufficient reserves of gas, oil, and coal, individually or collectively, to provide fuel for a fossil fired plant. Moreover, Intervenors contend that it is within the state of the art or would be within the state of the art at the time of completion of construction of a fossil fired power plant, to abate all or substantially all adverse and environmental effects which might occur as a result of a fossil fired plant. Thus, considering availability of resources, pollution abatement, and nuclear safety, the choice of the proposed Plant over other alternatives represents an unwarranted cost to the environment.

Response: Applicant thoroughly discussed the availability of various forms of fuel in Section 5.2.3 of the ASER. Applicant did not state that all fossil fuels were unavailable for future plants. There are certainly sufficient reserves of gas, oil and coal to provide fuel to a fossil fired plant. However, use of gas for such a plant would probably make it necessary for utility companies to curtail supply of natural gas to other customers. Neither gas, oil nor coal are economically viable alternatives and neither oil nor coal has any environmental advantages over nuclear fuel. It must be recognized that except for its use in power generation facilities, uranium is an essentially useless material. On the other hand, oil and gas have numerous valuable competing uses in the nation's economy, ie, gasoline, plastics, chemicals and fabrics, and coal has the potential for conversion to satisfy these numerous other uses. Uranium represents one means of conserving the limited hydrocarbon reserves for these other valuable uses. Applicant is not aware of any pollution control devices that have been demonstrated to "abate all or substantially all adverse and environmental effects which

50. (Contd)

might occur as a result" of coal-fired or oil-fired plants. This contention is without merit, ignores information set forth in the ASER and sets forth no facts in support of its conclusions.

51. Intervenors contend that not only are there sufficient supplies of coal, oil, and gas (and insufficient supplies of uranium), but also that supplies of coal, oil, and gas, are or would be at the time of completion of construction of a fossil fired plant, readily available to Applicant. Assumptions by the Applicant and the Regulatory Staff that coal, gas, and oil, although in existence is not practically available, are a direct result of the massive promotion of nuclear power. Thus, if Applicant finds it is in short supply of gas, oil, and coal, it is not because such resources are unavailable, but rather because Applicant, other utilities, and the Atomic Energy Commission have discouraged exploration and development of coal, gas, and oil reserves. Based upon the availability of coal, oil, and gas and the unavailability of uranium, the proposed Plant represents an unwarranted cost to the environment. To the extent that the Breeder is intended to provide fuel for the proposed Plant during any part of its defined useful life, the environmental, scientific, and safety problems in connection with the Breeder must be analyzed. In this vein, Intervenors contend that the Breeder is subject to such a myriad of unresolved problems that it will never be developed. Moreover, the Breeder will be the subject of intensive litigation and, accordingly, any reliance upon the Breeder for fuel in the near or short-term, is an unwarranted assumption.

Response: As set forth in Section 5.2.3 of the ASER, Applicant has not assumed that coal and oil would be unavailable for new plants. Applicant has concluded that gas is essentially unavailable for use in base load and intermediate generation. Those portions of this contention which are not misrepresentations of Applicant's analysis are clearly frivolous, insufficiently specific and unsupported by any factual showing.

52. (See Contention 33.)

53. Proliferation of nuclear power plants and the building of the proposed Plant deter persons, firms, corporations, and government from research and development into alternatives to nuclear power. Since, because of a short supply of uranium and the present inability to resolve problems concerning the Breeder, nuclear technology is a "stop gap" and short-term technology, construction and operation of the proposed Plant will continue to deter research and development into alternative methods for the generation of electricity, such as fusion, solar energy, magnetohydrodynamics, geothermal and other methods for the production of electricity. As a result, the construction of the proposed Plant represents a serious and unwarranted long-term cost and risk to the environment and to the development of future and alternative methods for the generation of electricity which may be needed in the future.

Response: This contention is patently frivolous and without merit.

54. Since announcement of the proposed Plant, Applicant has increased almost 100 percent its estimate for the total cost of the project. Costs have escalated because of public re-examination of nuclear power, because additional safety research has required amendment of the project in terms of hardware, and because of delays in connection with the licensing of nuclear power plants. Moreover, as Applicant admits, further delays are imminent because of an ongoing antitrust review not only delaying the proposed Plant but also resulting in the probability that Applicant may not be able to use in its system all of the electricity which could be generated from the proposed Plant. None of these delays or costs are evident in the construction of a fossil fired plant. Accordingly, the proposed Plant represents the selection of the most expensive and insufficient method of supplying any alleged demand for electricity and results in an unwarranted cost to the environment.

Response: While the estimated cost of the proposed Plant has increased considerably, the cost of alternative types of generation has also increased. Much of the increase has been due to inflation and increased labor rates. The proposed Plant is the least costly considering both initial capital cost and the operating and maintenance cost throughout the lifetime of the Plant. This analysis is shown in the ASER, Sections 5.1 and 5.2.

Applicant has never admitted that it expects further delays as a result of the antitrust review. In fact, it is stated in the ASER, "While in the case of Midland, this will not delay the construction permit nor construction,..." (Page 5.3-3). While delays of the type experienced by the Midland Plant are not likely for a fossil-fueled plant, the tremendous costs of electricity from fossil-fired base load units make nuclear plants the clearly preferable alternative. Additionally, fossil plants are subject to the possibility of regulatory delay because of regulation of water quality and air quality. Additionally, the Michigan Public Service Commission has proposed to the state legislature that it be given certification jurisdiction of all power plants. Also, if Applicant is actually found to be in violation of antitrust laws, fossil fuel plants are not exempt from such laws. This contention misrepresents some of Applicant's statements and fails to set forth facts to support its conclusion.

55. Assuming the validity of Applicant's assertion that it is necessary to build the proposed Plant for the production of electricity, Applicant has selected the wrong site for the Plant considering costs of generating electricity from other sites and considering the closeness to the proposed site to a large population center Additionally, Applicant has not selected the most efficient method of dissipating waste heat inasmuch as cooling towers, and specifically dry cooling towers, represent a better alternative than does the inadequate cooling facilities presently planned by Applicant.

Response: Applicant has fully demonstrated the contrary to all of these contentions in its ASER, Section 5.5.

The Applicant has shown that the use of natural draft cooling tower results in additional costs, which far outweigh the benefits derived from such cooling towers.

The contention of the Intervenors that the Applicant has not selected the most efficient method of dissipating waste heat is in error as indicated in the foregoing discussion on the natural draft cooling tower. The system is more inefficient than the use of the pond and results in loss of efficiency of the Plant.

It is well known that the thermal efficiency of a dry type cooling tower is less than natural draft cooling towers. Therefore, the contention of the Intervenors is doubly incorrect inasmuch as they are discussing the efficiency of methods of dissipation of waste heat in this statement. It is estimated that the use of a dry type cooling tower system will result in approximately 13% decrease in the Plant capability during the summer load conditions as compared to the Plant output with the cooling pond. On the annual Plant output basis, the use of the cooling pond versus the use of the dry type cooling tower results in a difference of approximately 9% in

55. (Contd)

favor of the cooling pond. It is also estimated that the use of the dry type cooling towers would increase the overall Plant cost by approximately 6% for a Plant with lower overall capability and lower overall efficiency. To the best of the Applicant's knowledge, dry type cooling towers of the size required for the Midland Plant have not been successfully designed, built or operated.

The use of the inefficient dry type cooling towers results in use of additional materials, additional fuel due to the inefficiency of such towers and represents a misuse of the materials and the natural resources. It, therefore, does not present any overall environmental advantage.

Additionally, the use of dry type cooling towers would require a different condensing system and turbine design than already designed for the proposed Plant. Change in such equipment would delay Plant completion by several more years, which would increase the overall Plant cost even more than mentioned above.

56. Assuming that Applicant will construct the proposed Plant, during the period of construction and thereafter, inadequate monitoring and surveillance programs and measures have been taken by Applicant or suggested by the Regulatory Staff. As a consequence, Applicant will not, unless different monitoring and surveillance programs are adopted, be able to assess adequately the environmental impact of the proposed Plant to be in a position to take remedial and prophylactic measures. Intervenors contend that pre and post operational surveillance programs in connection with radiation, thermal, chemical, and noise emissions from the proposed Plant are deficient in at least the following respects.

Response: The Applicant has demonstrated in Appendices A and B to the ASER, in Pages 11-14 of its Environmental Report, dated July 24, 1970, and in Pages 155-162 of the staff's prior draft detailed statement, dated February 10, 1971, that it will conduct adequate monitoring and surveillance programs, that it has sought qualified technical advice in the development of such programs and is willing to consult with appropriate agencies concerning modifications that would improve the programs.

57. The radiation surveillance program planned by Applicant is not sufficient adequately to monitor the effects of the proposed Plant: (a) Applicant's proposed radiation monitoring program will not provide, in the areas for which it is intended, a sufficient understanding of background radiation and additive radiation created by the proposed Plant because there are too few monitoring sites selected and because the frequency of monitoring at such insufficient sites is too irregular. (b) There are, Intervenors contend, several other areas of radiation effects which Applicant does not plan to monitor at all. It is Intervenors contention that a substantial monitoring of such areas must be made pre and post operational in order adequately to assess the environmental impact of radiation emissions from the proposed Plant. These areas are: 1. Phytoplankton; 2. Aquatic plants other than phytoplankton; 3. Terrestrial plants, including agricultural crops; 4. Zooplankton; 5. Benthic organisms; 6. Agnathans; 7. Osteichthyes; 8. Amphibians; 9. Reptiles; 10. Aves; 11. Mammals; 12. All sources of food grown or produced within a 50-mile radius of the proposed Plant, which food may be consumed within or without the 50-mile radius of the proposed Plant. The radiation monitoring and surveillance program with respect to the above areas should be of a sufficient scope so that the monitoring will detect effects of direct radiation, such as directly on to soil and plants, and indirect radiation such as when a terrestrial animal consumes a plant that has been irradiated or when a man eats a terrestrial animal which has consumed a plant which has been irradiated. Moreover, the program should include methods to determine concentration and biological magnification of radiation in the entire food chain. Intervenors contend that without such monitoring programs, an adequate environmental assessment of radiation risks and costs will not be made; and also without proper surveillance and monitoring, Applicant and the Regulatory Staff will be unable to take remedial and prophylactic measures regarding radiation effects.

Response:

(a) The monitoring sites to determine the impact, if any, of liquid releases from the plant are detailed in the ASER Appendix A and additional monitoring sites to determine primarily the impact, if any, of gaseous releases from the plant are detailed in the Applicant's PSAR as answer to Question 2.1 of Amendment 5. The latter response was included as Appendix K, Pages 155-162 to the staff's previous Draft Detailed Statement, dated February 10, 1971. A total of 24 sampling locations is shown including stations close to as well as remote from the plant to insure that differences in levels of radioactive material can be monitored. Further, upstream

57. (Contd)

as well as downstream stations were chosen to assure that plant originated additions of radioactive material will be monitored.

The stations are located roughly circularly around the site (terrestrial survey) to insure measurement ability regardless of wind direction. Similarly those stations located in the Tittabawassee and Saginaw Rivers will measure increased radioactive levels, if any, as a function of downstream distance from the plant.

Background radiation variability is determined in the preoperational survey as a function of both season and location through the use of all of these stations.

Air samples are continuously taken and analyzed weekly. Thermoluminescent Dosimeters measure direct dose continuously. Other samples, such as water and organic in origin are sampled on a regular basis to insure that sufficient data on background radiation dose and variability is available to measure the plant's impact when operational.

(b) In Appendix A of the ASER a description of sample types in the aquatic environment to be analyzed is included. These include Aquatic plants, benthos, and fish including Osteichthyes and Agnathans, if any, can be found. Additionally, water and substrate will be analyzed for radioactivity. Zooplankton and Phytoplankton were not included because of their general lack

57. (Contd)

of abundance in these waters. If, however, samples of sufficient size can be reasonably obtained, they could also be analyzed for radioactive content though their value in estimating dose to man is highly limited.

A description of sample types in the terrestrial program can be found in the afore-referenced Appendix K to the previous Draft Detailed Statement. Few agricultural crops are grown in the vicinity of the plant. Hence, out of necessity the survey is limited to air and direct dose monitoring. Again, if commercial crops are grown in the future in the vicinity of the plant, they will be sampled during the growing season for radioactive content if particulate releases to the atmosphere occurs.

It is unnecessary to sample all crops within a 50-mile radius of the plant. Due to atmospheric dispersion, concentrations naturally decrease as one moves further from the plant. Hence, a survey location chosen near the plant provides an opportunity to determine the maximum concentration of radioactive material in a given sample. One necessarily measures at these locations first.

The program as outlined in the PSAR, will measure all contributions to dose to man, ie, direct, inhalation, and ingestion.

There are no facts set forth in support of this contention, and it is insufficiently specific.

58. Surveillance and monitoring of thermal effects from the proposed Plant are inadequate in that sufficient sites are not provided for and at such insufficient sites, the frequency of monitoring is inadequate. Moreover, the description of the Thermal Monitoring Program is so vague so as not to provide a meaningful point of departure for a substantive discussion. Additional sites should be provided on the River, Bullock Creek, Saginaw River, Pine River, Chippewa River, Cass River, and Lake Huron. The scope of the Thermal Monitoring Program should be sufficient so as to assess the thermal effect upon all organisms which inhabit each of the bodies of waters or rely upon each of the bodies of waters as a source of food and water.

Response: It is clear that pond discharges within approximately 1°F of the River temperature are not going to have any meaningful thermal effect on the River or on any other body of water. Applicant, however, has indicated on Page 9 of Appendix A to the ASER that it will make semiannual samples. In addition, as pointed out in response to Contention 60, Dow will be regularly monitoring thermal parameters. This, under the circumstances, appears to be sufficient. If it should appear at any time that there is a useful purpose to be served for more frequent or extensive sampling, Applicant would consider expanding its program. Saginaw Intervenors have set forth no facts to support this contention.

59. Applicant does not propose and the Regulatory Staff has not suggested monitoring the indirect effects of thermal discharges from the proposed Plant. Thus, the health and development of terrestrial plants and animals may be adversely affected by changes in ambient air temperature due to thermal discharges.

Response: Applicant does not expect that there will be any significant adverse environmental effects as a result of thermal discharges from the proposed Plant. As mentioned in response to Contention 5, Bechtel has observed water grasses flourishing in the dead of winter. However, this is certainly neither significant nor adverse. The heat from the pond will tend to increase local turbulence in the atmosphere as mentioned at Page 2A-23 of Appendix O to the ASER. This would have the effect of increasing diffusion of plant emissions. Under certain conditions the air temperature over the pond and for short distances from the pond could be increased by a very few degrees. None of these effects appear to have any significant adverse effects warranting monitoring.

60. Despite the fact that chemicals will be discharged into various bodies of water both by Applicant and Dow as a result of the operation of the proposed Plant, neither Applicant nor Dow has been required to develop monitoring programs of sufficient frequency and scope with respect to such chemical discharges. Intervenors contend that the absence of any monitoring of chemical discharges represents a failure in an adequate environmental analysis.

62. In addition to monitoring and surveillance by Applicant, since Applicant, Dow Chemical, and the Regulatory Staff have supported the construction of the proposed Plant at least in part so as to provide a benefit to Dow Chemical Company, in return for the benefit it will be receiving, Dow must have environmentally clean hands. Accordingly, Dow Chemical Company should be required to monitor its discharges in the areas of thermal, chemical, and noise from its own facilities so as to determine whether it should be rewarded with low-cost energy for purposes of expansion of its facilities. Dow Chemical's monitoring and surveillance should include frequency and scope at least as comprehensive as Intervenors have contended should be required of Applicant.

Response: Applicant's ecological surveillance program as described in Appendix A to the ASER should be adequate to determine if chemical discharges from the plant are having any significant adverse effects on the river. Saginaw Intervenors fail to inform Applicant in what respect the frequency and scope of its program is deficient. Dow will be maintaining a monitoring system on its discharges to the river or on the river for the following measurements:

Total Oxygen Demand

Dissolved Oxygen

Chloride Ion

Ultraviolet Spectroscopy for Aromatic Compounds

Temperature

These measurements will be continuous and transmitted to a centrally located control center.

60. and 62. (Contd)

Dow will do bio-monitoring, including fish and macro-invertebrates. This monitoring will include the discharges from the proposed nuclear plant also.

Dow is and will be monitoring noise levels in compliance with Occupational Safety and Health Agency standards.

Dow will sample and measure its effluents for chlorinated hydrocarbons. These are considered separately from dissolved solids in the Michigan Water Resources Commission standards.

61. Applicant has neither discussed nor proposed to monitor noise pollution which will be created by the construction and operation of the proposed Plant. Applicant should establish a monitoring program of sufficient frequency and scope so as to be able to monitor noise pollution and its effects upon man and other animals.

Response: Applicant will monitor noise levels as required by the Occupational Safety and Health Agency standards.

62. (See Contention 60.)

63. Intervenors contend that the cost of a monitoring and surveillance program discussed in this section should be borne by Applicant and Dow Chemical Company and not passed on to the public by requiring the Michigan Water Resources Commission to do the work.

Response: There is no plan to attempt to coerce the Michigan Water Resources Commission to pay for Applicant's monitoring program. On the contrary, the new surveillance fee regulations require us to pay for what they normally would have covered.

64. The National Environmental Policy Act requires the Atomic Energy Commission to make an independent detailed environmental analysis concerning the licensing of the construction of the proposed Plant. Situated throughout this Statement of Contentions are areas of environmental impact which the Regulatory Staff has failed to consider. Accordingly, the Statement is insufficient as a matter of law for not considering such areas.

65. The Regulatory Staff has illegally contracted its obligation to prepare the Draft Statement to Argonne National Laboratory. The arrangements between the Regulatory Staff and Argonne are unknown to Intervenors and, accordingly, they cannot make further contentions with respect to the procedural inadequacies of the relationship. For example, we do not know whether Argonne was requested to do independent analysis or whether, as appears from the Draft Statement, Argonne and the Regulatory Staff have only accepted, uncritically, submissions by the Applicant.

66. Based upon information and belief, Intervenors contend that the Regulatory Staff and its contractees have failed to provide an independent, substantive review required by the National Environmental Policy Act.

67. The Draft Detailed Statement fails to incorporate all of the information upon which it is based and fails to include a complete discussion of all sides of a particular issue. As such, the Draft Detailed Statement is an incomplete environmental analysis and is insufficient as a matter of law.

Response: Contentions 64-67 are patently frivolous, are unsupported by facts, and are lacking in the requisite specificity. As such they should be stricken.

68. The Regulatory Staff has failed to secure comments on a realistic schedule from all of the Federal, State, and Local agencies which have an interest in commenting. Moreover, because the Regulatory Staff has only provided for a less than 30-day comment period (considering mailing time), there is insufficient time for various of the agencies adequately to comment upon the Draft Detailed Statement. Accordingly, this procedural inadequacy built into the Regulatory Staff's preparation has resulted in an inadequate analysis.

Response: The 30-day comment period is provided in Appendix D to 10 CFR Part 50 and is therefore not in issue in this proceeding.

69. The Regulatory Staff has failed to quantify and qualify in monetary terms all the costs, risks, and alleged benefits with the result that a sound, economic environmental analysis cannot be made. Moreover, the Regulatory Staff has as yet to prepare, for the guidance of Applicant, guides for preparation of environmental reports by those who are seeking construction permits. As such, the Regulatory Staff has failed to implement its obligations pursuant to the National Environmental Policy Act.

70. The Regulatory Staff has not required sufficient detailed preparation by Applicant of all areas of environmental concern and, therefore, in its implementation of its responsibilities under the National Environmental Policy Act, the Regulatory Staff has failed to acquire adequate investigation and reports by Applicant and its consultants.

71. The Regulatory Staff has failed to describe all risks inherent in the generation of electricity by nuclear power; and, accordingly, the Draft Detailed Statement is incomplete. For example, the aspects, both in terms of destruction of life and property, of a postulated loss of coolant accident resulting in an uncontrolled meltdown are not factored into the Regulatory Staff's Draft Statement.

72. The Regulatory Staff has failed to consider the actual cost of generating electricity through nuclear power. The actual cost includes such direct and indirect costs as increased cancer and leukemia, medical costs relating to those and other diseases from radiation exposure, and costs of decommissioning the proposed Plant when its defined useful life is over. The failure of the Regulatory Staff to have considered these costs, as well as the cost of disposal of high and low level radioactive wastes results in the Draft Detailed Statement being insufficient as a matter of law.

Response: Contentions 69-72 are frivolous, unsupported by fact and lacking in requisite specificity and should be stricken.

73. The issue of demand for power or need for power is not a function of a simple application of projected figures to rated generating capacity. In the last two decades, we have seen a demand for electricity multiply, at least as interpreted by the utilities, the power industry, the Atomic Energy Commission, and other administrative agencies. A simple arithmetic extension of the present demand curve, as so asserted, makes it clear that in a very short period of time our economy will not be able to meet such a demand. There has been a failure to do any analysis as to means to create a decrease in demand for electricity or an elimination or curtailment of industrial and other uses of electricity which could be decreased or eliminated so the economy does not suffer in terms of goods and services. From a long range environmental standpoint, the social and scientific stimuli currently being injected into our economy encouraging peak uses of electricity must be eliminated. It is in this sense, as well as in the more practical sense of an analysis of actual figures produced by Applicant and the Regulatory Staff, against which any need or demand for power must be analyzed.

74. Intervenors contend that under the National Environmental Policy Act the proposed Plant may not be licensed unless it is demonstrated that the electricity allegedly needed from the proposed Plant, is unavailable to Applicant and/or the users in Applicant's area from any other source and, unless it is demonstrated that such demand for electricity represents useful social stimuli considering the long range rationalization of our national energy policy.

75. Intervenors contend that any demand for electricity generated by advertising or promotional efforts or by competition among public utilities to encourage the use of electricity cannot validly be rewarded pursuant to the National Environmental Policy Act.

76. Intervenors contend that in making an analysis of the promotional or advertising aspects of any demand for power, one must analyze actual advertising figures the results of advertising campaigns, and a comparison of those results with statistics in areas, if any, where promotional advertising as a function of demand has not taken place. Moreover, any environmental analysis must consider whether a demand is created by encouraging the public to use unnecessary or non-utilitarian products which use large amounts of energy in the course of fabrication and production. Thus, if any portion of Applicant's demand is directly related to the production of such goods, an analysis has to be made as to whether the production of such goods should be encouraged or whether by a denial of electricity, one encourages the production of alternative goods which have similar end uses, but which require substantially lesser amounts of electrical energy to produce.

Response: Contentions 73-76 are frivolous, unsupported by fact, unrelated to any issue in this proceeding and without merit. They should therefore be stricken.

76A. Intervenors contend that notwithstanding promotional or advertising efforts and notwithstanding the lack of analysis of the end uses of energy, Applicant and the Regulatory Staff have failed to set forth adequately a responsible record upon which to substantiate claims for demand or need for electricity from the proposed Plant.

Response: Applicant has fully substantiated the demand for electricity in Section 2 of the ASER. This contention is unsupported by any facts and totally lacking in requisite specificity.

77. Applicant recently announced (January 1972) that it was cancelling construction of a Combined Cycle Plant because its statistics underlying the demand and the need for such a plant had been re-evaluated and were not correct. The same demand figures, which Applicant has admitted are no longer up to date, are being used to support the claim for demand for electricity from the proposed Plant.

Response: During January 1972, the Saginaw River Plant, which was being considered for operation in the summer of 1975, was determined not to be necessary as a result of The Detroit Edison Company's decision to retain, through the summer of 1975, 383 MW of capacity previously scheduled for retirement. The lessened capability on Applicant's system beginning in 1976 will be covered by The Detroit Edison Company's Greenwood Unit 1 which in January of 1972 was advanced by one year from its previous schedule. Applicant admits that its demand projections for the summer of 1975 were recently revised. This revision, made in October of 1971, was an increase of 20 MW and the revised demand figure is contained in Table DEM-1 in Exhibit 1 to Section 2 of the ASER, as amended by Amendment 1, dated December 14, 1971. Even had the revision been a decrease, it is ridiculous to suggest that a 400 MW Plant would be cancelled for so minor a fluctuation. This contention sets forth no facts in its support, is clearly incorrect and should be stricken.

78. Applicant's survey and analysis leading to its projected load forecasts is unsound in that it overstates the future industrial needs of Michigan, the future population growth of Michigan, and fails to recognize that demand for electricity will decrease on an absolute and percentage basis. Moreover, Intervenors contend that Applicant has not considered all generating facilities which would be available, given certain interconnections, to consumers in its franchise area and, accordingly, Applicant has used a statistically erroneous geographic area in which to analyze a demand for electricity. Thus, Applicant's statement of electric reserves is misleading in that it does not cover all available reserves.

Response: The electric energy forecasts contained in Section 2 of the ASER are based upon empirical research and analytical studies relating to future growth of the Michigan economy and its population. The forecast of industrial growth for Michigan upon which a part of the energy forecasts are based is conservative relative to historical experience. While the Michigan economy outpaced the growth in the national economy during the sixties, this is not expected to continue during the seventies; and the Applicant's energy forecasts reflect this change.

The energy forecasts reflect population growth for the Applicant's service area, and specifically the adult population growth, based on population estimates published by the State of Michigan Bureau of Planning and Program Development which were prepared based on research at the University of Michigan Population Studies Center. The Applicant's analyses of these population projections indicate they reflect sound and reasonable estimates of future adult population growth for Michigan. It should be noted that adult population projections for the next decade are subject to less forecast error than total population estimates because future fertility and birth rates (the largest influences on total population growth) are not a factor in the adult population forecasts. Adult population projections for the next decade are based primarily on an aging of persons already present.

78. (Contd)

The ASER, Section 5.3, analyzed the availability of power from other systems and concluded that such power had no advantages and several disadvan ges to producing the power from the Midland Plant. This contention is unsupported by facts, is lacking in specificity and is without merit.

79. Applicant and the Regulatory Staff's analyses assume that the need for power is constant and firm and will remain so during at least the ten year period between 1970 and 1980. There is no basis for making this assumption or relying upon statistics during the period 1960 to 1970 because the factors governing each such period are not identical. For example, the rate of population increase during the ten year period, 1960 to 1970, was significantly greater than is or will be the rate of population increase during the period 1970 to 1980. Applicant's analysis has not taken into account this difference.

Response: The Company's analyses of future electric energy needs do not assume "constant and firm" growth based on the 1960-1970 period. Analyses of growth during the past decade and other periods are made to determine underlying trends and to determine interrelationships with economic indicators and demographic parameters to provide a sound basis for developing system energy forecasts. As explained in Section 2.0 of the ASER modifications to these trends are made to reflect factors judged likely to be different during the future that will significantly affect the energy forecasts. For example, residential customer forecasts are based on adult population estimates and the estimated relationship between customer growth and increases in adult population. Neither the estimated growth in adult population nor the relationship between customer growth and adult population has been assumed to remain the same as experienced in the 1960-1970 period. Also, modifications from projections based on historical trends have been made in developing energy forecasts for other classes of services. This contention is unsupported by facts and without merit.

80. Applicant's analysis with regard to projected power needs is based, in substantial part, on past statistics. Applicant does not take into account that much of the power generated in earlier base periods was of a horizontal character in the sense that areas which never before had access to electricity were provided a source of electricity. Applicant and the Regulatory Staff have not taken into consideration in their projected land forecasts that such needs for electricity have already been met by virtue of existing generating capacity.

Response: The base period for deriving most basic trends and relationships used as a starting point in the preparation of electric energy forecasts has been the last decade as shown in Exhibit 1 to Section 2.0 of the ASER. Electric service was available in virtually all areas within the Company's service territory at the beginning of this base period, and thus expansion of electricity into new areas is not a significant factor in assessing future energy needs relative to the base period. This contention is unsupported by facts and without merit.

81. Applicant's projection assumes a continued growth and development of industry in the State of Michigan. Applicant has not adequately assessed the fact that there is a national and statewide conservation movement which may severely inhibit increases in industry. Applicant also has not considered the possibility that industry in Michigan will seek to expand elsewhere and, thus, not be available to support an alleged increase in demand.

Response: The contention by the Intervenors that a national and statewide conservation movement could inhibit increases in industry has been given consideration in the development of electric energy forecasts. The probability that these factors will materially reduce industry uses of electrical energy during the next decade is considered unlikely based on facts to date. It is a fact that many industrial customers have installed and are continuing to install electric energy-using equipment to abate or eliminate environmental pollution, and that this trend toward greater use of electric energy to improve the environment will have a significant effect on future increased electric energy usage by industry. See ASER §2.0.

The growth of industry in Michigan in relation to national industry growth has also been considered in the development of the electric energy forecasts, and reflected in the industrial energy sales forecasts. The energy sales forecasts reflect the judgment that the Michigan economy will increase at about the same rate as the national economy during the next decade, but will not grow faster than the national economy as it did in the early sixties. This contention is unsupported by facts and without merit.

82. Applicant and the Regulatory Staff assert that the electricity from the proposed Plant is needed in order to maintain a rate structure which is competitive with the cost of energy in other States. Applicant fails to recognize that the National Environmental Policy Act requires a long range analysis and, as such, does not permit Applicant to assume that somehow the State of Michigan and Applicant are to be favored over some other area. It may be inconsistent with the National Environmental Policy Act and a rational resolution of our National Energy Policy to encourage further electricity uses in the State of Michigan. Finally, in its so-called competitive analysis, Applicant has failed to take into account what effect, if any, the increased purchase of power (by virtue of a national interconnection of grids) would have upon the alleged need for power.

Response: Apparently, Intervenors are contending that Applicant should favor the use of less efficient generating units that will produce the most expensive electricity rather than striving for efficiency and low-cost power. This contention is clearly frivolous, not supported by any facts and without merit.

83. Applicant has failed to analyze its need for power in light of any environmentally sound program to share electricity with coordinating utilities within and without the State of Michigan and, particularly, municipalities and consumer owned cooperatives.

Response: Applicant does have interconnection agreements and wholesale agreements with its adjacent utilities, municipals and cooperatives. The additional loads and emergency capability from such are included in Applicant's power supply analysis. The addition of the Midland Plant will provide economy energy during nonpeak hours, thereby providing for the reduction of generation from less efficient equipment on such other systems. This contention is unsupported by facts and should be stricken.

84. (See Contention 37.)

85. Applicant asserts that the proposed Plant is necessary to provide "a plentiful and inexpensive supply of electricity . . . to maintain and enhance the living standards. . . ." Applicant has failed to analyze, however, either the need to conserve energy resources, a need which appears to be environmentally more sound than a need to make energy resources more plentiful. Applicant does not state whose living standards are going to be increased by the proposed Plant, and it does not analyze whether any substantial segment of the population's living standards may be decreased as a result of the proposed Plant in terms of a degraded environment which would adversely affect health, life, and property.

Response: The adverse effects that the Plant will have on the environment are enumerated in the ASER and in most cases it is clear how such effects will affect individuals. It is equally clear that no substantial segment of the population will have its living standards decreased as a result of these effects and that the Plant will not create a degraded environment which would adversely affect health, life and property.

On the contrary as indicated in the ASER the Plant will enable Dow Chemical to shut down some fossil fuel plants that presently violate standards designed to protect the public health and safety, will provide electricity to enable municipalities and industry to reduce pollution, enable industry to maintain and create jobs and enable Applicant to run older less efficient plants less often.

This contention is not related to any issue in this proceeding, is lacking in specificity and is unsupported by any facts.

86. Applicant's projected demand erroneously assumes that all future needs for electricity will be increased or new demand and will not reflect merely replacement demand. For example, it is true that there may be increased residential construction; however, Applicant ignores that a person who builds a new home may be, at the same time, vacating an old home - which new home would not, therefore, represent an increase in demand for electricity.

Response: The Intervenors' contention that the forecasted demand for electric energy does not properly reflect replacement demand is unfounded. Net increase in residential customers is used as the basis for forecasting residential energy sales. Net increases in energy sales are also used in developing the forecasts for the other classes of service. This contention is clearly frivolous and unsupported by any facts.

87. There is no basis for Applicant's assumption that room air conditioners will increase from 160,000 to 360,000 in four years and that they all will be used at peak periods, particularly if the citizens are educated to conserve energy.

Response: The assumptions regarding air-conditioner electric energy usage and the growth in number of residential customers using air-conditioners are supported by analyses of past growth in air-conditioner usage in the Company's service area, and growth in other areas of the country where by reason of climate their growth in air-conditioner usage tends to lead growth on the Company's system. The popularity of air conditioning has become widespread throughout all areas of the country where hot and humid weather occurs. A further indication of the growing popularity of air conditioning use is the growing number of automobiles sold with air conditioning. Over 60 percent of domestic-produced cars have factory-installed air conditioning.

Relative to Intervenors' comments regarding use of air-conditioners at peak periods, it has not been asserted or assumed that all air-conditioners would be used at peak periods. However, air-conditioners typically are used during extremely hot weather when summer peak periods normally occur. This contention is unsupported by facts and without merit.

88. Applicant has misanalyzed the projected growth of its major users of electricity such as General Motors and Dow Chemical. The projected increases in production and uses of electricity by such major users are inordinately high in light of the rate of population for the applicable base period and the national movement to conserve electricity. Concomitantly, Applicant has failed to factor into its projection the possibility that rate structures will be revised so as to make large use of electricity on a per unit basis more expensive thereby discouraging the increased use of electricity.

Response: The Intervenors' contention that forecasted growth for major customers such as General Motors and Dow Chemical is high relative to population growth and energy conservation movements is unsupported. Although the effect of some factors on energy forecasts is necessarily based on judgment, the Company is continually evaluating the impact of changes in underlying energy demand and reflecting such evaluations in its energy forecasts.

One of the more important factors influencing automobile sales and production is adult population growth. The adult population growth rate will be higher in the seventies than in the sixties. However, the Company's forecast of energy sales to General Motors is based on a lower rate of energy usage by General Motors plants than experienced in the sixties, because other factors are expected to more than offset the higher adult population growth. The forecasts of electric energy sales to other major users are also based on conscientious evaluations of available information and factors judged to be significant. As cited in answer to Contention 81, the effect of energy conservation movements has been given consideration in the development of electric energy sales forecasts.

The energy forecasts do reflect consideration of changes in rate structure. The cost of electric energy is expected to remain competitive with

88. (Contd)

other energy sources. Energy is essential for industry to function, and it is considered most probable that electric energy will continue to be a dominant source of energy for industry during the seventies. This contention is unsupported by facts and without merit.

89. Applicant has erroneously assumed that the Gross National Product will continue to spiral. The relationship which the Applicant asserts exists between the automobile industry and the Gross National Product does not take into consideration that many metropolitan areas, including those in the State of Michigan, are encouraging the development of mass transit which would result in a relative decrease in the production of automobiles.

Response: The assumptions regarding growth in the Gross National Product reflected in the electric energy forecasts are based on research and analysis and can be considered conservative in relation to many other published forecasts by eminent economists and organizations with expertise in the field of economic forecasting. The effect of the development of mass transit systems in metropolitan areas has been considered in the energy sales forecast, but such systems are not expected to be developed to such an extent as to have a significant effect on automobile production during the seventies. This contention is unfounded and without merit.

90. Applicant has incorrectly stated the current demand for electricity in light of reports by the Edison Electric Institute and the Association of Electrical Illuminating Companies. The Annual Report published in late 1971 by the Edison Electric Institute disagrees with Applicant's assertions as to the character and scope of a so-called "power crisis."

Response: Applicant has not referred to a "power crisis" and Applicant is not able to locate any annual report of the Edison Electric Institute. This contention is unfounded and without merit.

91. Applicant's projections with respect to electrical needs for street and highway lighting are unsound. Applicant's own figures show a decrease in street and highway lighting for the years 1971 and 1972. These figures do not support Applicant's projections for the years 1973 and beyond, particularly since highway and super-highway construction has and will become more limited.

Response: Energy forecasts for street and highway lighting reflect the present inadequate lighting of many public streets and highways. The existing concern for public safety because of the high rate of crime and vandalism will be major contributing factors to greater use of lighting on public streets and highways. The energy forecasts reflect the fact that most new and replacement street and highway lighting is mercury vapor type of lighting as opposed to incandescent lighting, and that the electric energy requirements per unit of light output is lower for mercury vapor lighting. The Intervenors' contention that Applicant's street and highway lighting energy sales decreased in 1971 and 1972 is false. Street and highway lighting energy sales have increased every year since the end of World War II. The slightly lower rate of growth experienced in 1971 than projected for the seventies is due primarily to fewer installations then normal being made due to a 3-1/2 month strike by the Company's Operating, Maintenance and Construction employees during the year. This contention is unsupported by facts and without merit.

2. Applicant has not provided any support and, accordingly, its analysis is unsound, with respect to its claim for the need for electricity will provide jobs for an increased number of adults. Once again, Applicant's projections have failed to take into account the environmental movement and the demands of society for industrial progress and national growth consistent with environmental protection.

Response: New industry or expansion of present industry is a necessity if jobs are to be provided to the growing adult population; and energy is essential to industry. Without energy, industry could not function. The current trend is for present industry to use electric energy in greater quantities in order to increase productivity and to help abate environmental pollution. In order for essential energy to be available to new or expanding industries, more electric energy will be needed, and this growth in energy will be helping to achieve the goals of environmental protection. This contention is unsupported by facts and lacking in requisite specificity.

93. Applicant's need for electricity insofar as it relates to its claim to further an improvement in air and water quality is specious, since Applicant fails to take into account the effects upon the environment, (absolutely and relatively by virtue of a cost-benefit analysis) of the production of electricity which assertedly will be used to replace alternative forms of the production of electricity.

Response: Insofar as this contention can be understood it is clearly frivolous in that the whole ASER and Draft Detailed Statement take into account the environmental effects of producing electricity.

94. The Regulatory Staff in connection with the need or demand for power has failed in its obligations to make an independent analysis, but rather has accepted, uncritically, statements of the Applicant.

Response: This contention is unsupported by facts and totally lacking in the requisite specificity.

General Response to Contentions 95 through 111: Saginaw Intervenors' massive attack on the Michigan Water Resources Commission, its standards, and its certification, is totally irrelevant to this proceeding. Contrary to the contentions of Saginaw Intervenors, the Calvert Cliffs' decision does not require AEC to evaluate and analyze state water quality standards. The duty of the AEC is clearly set forth in the Calvert Cliffs' decision:

> "Certifying agencies do not attempt to weigh that damage against opposing benefits. Thus the balancing analysis remains to be done. It may be that the environmental costs, though passing prescribed standards, are nonetheless great enough to outweigh the particular economic and technical benefits involved in the planned action. The only agency in a position to make such a judgment is the agency with overall responsibility for the proposed federal action - the agency to which NEPA is specifically directed."
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> * * *
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> "Water quality certifications essentially establish a minimum condition for the granting of a license. But they need not end the matter. The Commission can then go on to perform the very different operation of balancing the overall benefits and costs of a particular proposed project, and consider alterations (above and beyond the applicable water quality standards) which would further reduce environmental damage."

Thus, having received the certification, the duty of the AEC is to evaluate the effects, costs and benefits of the Plant regardless of the Michigan standards and certification. This the AEC did and came to the conclusion that liquid releases from the Plant will cause no adverse environmental effects (Page 115). The certification merely says the state is satisfied. The AEC duty is not to determine whether the state should have been satisfied, but to determine whether the AEC is satisfied in light of its cost-benefit analysis. In addition to the above reasons for striking Contentions 95 through 111, are the following:

95. Consistent with the Calvert Cliffs' decision, the Atomic Energy Commission has an obligation to evaluate and analyze state water quality standards and revise such standards in the event that they provide insufficient protection for the environment. Intervenors contend that the Water Resources Commission standards and its Water Quality Certification for the proposed Plant are based upon inadequate water quality standards. Accordingly, the National Environmental Policy Act requires the Atomic Energy Commission to review and upgrade such water quality standards.

Response: This contention states that the Michigan Water Resources Commission standards and certification are inadequate without setting forth any facts in support of that general conclusion. In addition to the objection set forth above in the General Response (supra Page 103), it is lacking in specificity and unsupported by any facts and should be stricken.

96. The local laws of the State of Michigan (Section 6(a) of the Public Act 245 of the Act of 1929) makes it unlawful to discharge any substance into the state waters which is or may become injurious to the public health, safety and welfare. The state law does not provide an exception to permit discharges into state waters which may result in a concomitant benefit in an unrelated area. Accordingly, the Water Resources Commission has no authority to permit Applicant to make any discharges into state waters from the proposed Plant, and the Atomic Energy Commission may not, therefore, rely upon such an invalid water quality certification in the licensing of the proposed Plant.

Response: Applicant will not discharge any substance into the state waters which is or may become injurious to the public health, safety and welfare. The Michigan Water Resources Commission held public hearings on the Plant discharge at which some of the Saginaw Intervenors made appearances. This proceeding is not the place to make a collateral attack on the Michigan Water Resources' determination. The last sentence of this contention is a complete non sequitur and totally unsupported by any factual matter. In addition to the objection set forth above in the General Response (supra Page 103), this contention should be stricken as lacking in specificity and not involving any issue in this proceeding.

97. The Water Resources Certification permits Applicant too long a period of time to report excesses of standards established by the Water Resources Commission. More frequent reporting is necessary to prevent negligent or intentional violations of the established water quality standards.

Response: This appears to be totally irrelevant to this proceeding and should be stricken.

98. The Water Resources Certification is based upon a classification of differing standards for differing bodies of water throughout the State of Michigan. The Water Resources Commission has no such authority in light of the laws of Michigan, and the National Environmental Policy Act does not permit such a classification which, by its operation, subjects some bodies of rivers to environmental degradation. Accordingly, the Water Resources Certification is based upon an illegal standard.

Response: Section 5 of the Michigan Water Resources Commission Act (Act 245, Public Acts of 1929, as amended) provides in part:

> "The commission shall establish such pollution standards for lakes, rivers, streams and other waters of the state in relation to the public use to which they are or may be put, as it shall deem necessary..."

Thus, the Water Resources Commission specifically has the power which Intervenors deny in Contention 98. Moreover, this is precisely the type of regulation which is envisioned for interstate waters by Section 10(c) of the Federal Water Pollution Control Act. Specific attention might be drawn to Section 10(c)(3) of the Act which provides in part:

> "In establishing such standards . . . the appropriate State authority shall take into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses."

Water Resources Commission certification is not a Federal action and is not subject to the National Environmental Policy Act. Saginaw Intervenors are again attempting to make a collateral attack on the Water Resources Commission.

This contention is clearly a misrepresentation of the law, lacking in specificity, and irrelevant as stated above in the General Response (supra Page 103).

99. Assuming the validity of a classification of standards for bodies of rivers, the Water Resources Commission classification is insufficient in that based upon the existing quality of the River and Bullock Creek, the operation of the proposed Plant will violate all standards set forth by the Water Resources Commission in its Certification for the River and Bullock Creek, and more specifically described in (110) below. As such, the Water Resources Certification is insufficient.

Response: The Water Resources Commission certification has found that the proposed discharges from the Midland Plant will meet the standards proposed for the River in 1974. These standards are higher than those presently applicable to the River. Apparently, Saginaw Intervenors are contending that this certification is a falsification by the Water Resources Commission. In any case, it is another attempt to collaterally attack the Water Resources Commission's Order of Determination and Certification. This contention contains no facts in support of its position, is totally lacking in specificity and is frivolous on its face. In addition it is irrelevant as provided in the General Response (supra Page 103).

100. The Water Resources Commission states that it is changing the designation of the River essentially from a standard of "tolerant fish" to a better standard of "intolerant fish." This change, due to become effective January 1, 1974, will not be able to be achieved if Applicant is permitted to operate the proposed Plant at the proposed site and as currently designed. This is particularly true in light of the fact that other industries, including, but not limited to, Dow Chemical Company and Dow Corning Company, continue to pollute the River and its confluences. Accordingly, permission to Applicant, in light of the circumstances, represents an unwarranted cost to the environment.

Response: The Water Resources Commission has certified that in its opinion the construction and operation of the Plant "will be conducted in a manner which will not violate water quality standards." The standards referred to are those becoming effective in 1974. The fact that other entities must be subjected to more stringent regulation in order to achieve the new standard is not relevant. The relevant question as discussed in the General Response (supra Page 103) is whether the AEC, in its balancing, determines that any applicable costs are outweighed by the applicable benefits. Intervenors' contention sets forth no facts to support it, is totally lacking in specificity and is frivolous on its face.

101. The Water Resources Commission Certification has failed to take into account the standard or criteria for discharges proposed by Applicant into Bullock Creek, and, thus, the Water Resources Certification is incomplete.

Response: All of Applicant's discharges to the Tittabawassee must meet the Water Resources Commission's Order of Determination. Most of these discharges will be from the cooling pond, however, occasional discharges will be made by way of Bullock Creek as described in answer to Staff Question 13, ASER, Pages 6.13-1 and 6.13-2. All of these discharges to the Tittabawassee River will be within the limitations imposed in the Water Resources Commission's Order of Determination. Bullock Creek is not a navigable stream and as such discharges into it are not regulated by the Water Resources Commission. It is the discharge from Bullock Creek to the Tittabawassee River that is relevant to the Order of Determination and the subsequent Certification. This contention is not supported by any facts, and is insufficiently specific.

102. The Water Resources Certification has erroneously concluded that the operation of Applicant's proposed Plant will not violate the standards set for total dissolvable solids in the River. This is because the analysis of Applicant's contribution to total dissolvable solids does not consider Dow Chemical's contribution and Dow Chemical's increased contribution as a result of planned expansion due to, assertedly, low cost energy and process steam from the proposed Plant. Moreover, the discharges of total dissolvable solids by Dow Chemical are downstream from those proposed by Applicant, and, accordingly, the geographic point in the River used as a basis for Applicant's analysis is unrealistic and does not result in a true analysis of the actual amount of total dissolvable solids which are or will be contained in the River.

Response: The Water Resources Commission has certified that in its opinion, construction and operation of the Plant "will be conducted in a manner which will not violate water quality standards." Intervenors fail to explain the source of their information that the Water Resources Commission failed to consider Dow Chemical's contribution to the river. As pointed out in response to Contention 9, Dow has in fact made a stipulation to the Michigan Water Resources Commission to drastically reduce its releases to the river by 1974. Insofar as Saginaw Intervenors' contention is based on hypothetical increases in Dow Chemical's discharges, it fails to point out that any such increase would have to be approved in advance by the Michigan Water Resources Commission pursuant to Section 8(b) of the Water Resources Commission Act. It is not reasonable to anticipate that the Water Resources Commission would approve an increased discharge in violation of law. This contention does not set forth the facts on which it is based, is insufficiently specific, is based on unreasonable assumptions, is apparently frivolous and is irrelevant as stated above in the General Response (supra Page 103).

103. The standard set by the Water Resources Commission with respect to the amount of total dissolvable solids permitted to be discharged in or accumulated in the River is qualitatively unsound in that it does not consider the highly injurious and toxic effect of certain classifications of total dissolvable solids such as the solids resulting from the massive daily discharges by Dow Chemical of chlorinated hydrocarbons. Thus, the standard set for the total dissolvable solids, a standard which permits certain additions to the total dissolvable solids by Applicant as a result of the proposed Plant, is insufficient to protect or upgrade the water quality of the River.

Response: The Water Resources Commission does separately consider the effects of any toxic and deleterious substances and in its Order of Determination forbids Applicant to discharge substances that are or may become injurious to the public health. Additionally, Saginaw Intervenors ignore the fact that in addition to Standard 6 for total dissolved solids the Michigan Water Resources Commission Standard 5 regulates toxic and deleterious substances. As stated in response to Contention 9, Dow Chemical has stipulated to substantially reduce its discharges by 1974. Once more Saginaw Intervenors are making an irrelevant collateral attack on the Water Resources Commission. This contention sets forth no facts in support of it, misrepresents Michigan water quality standards, is insufficiently specific and is irrelevant as stated above in the General Response (supra Page 103).

104. The Water Resources Commission has established maximum temperature levels for the River. Intervenors contend that as a result of operation of the proposed Plant and, particularly during a drought year, such as was experienced in 1944-1945, the maximum allowable temperature levels will be exceeded at points in the River below the Dow Chemical Waste Water Treatment Plant.

Response: The Order of Determination prohibits discharges that would cause the River temperature to exceed the maximum allowable temperature standards. Applicant has announced a supplemental cooling system on the pond discharges to cool the water to within approximately 1°F of the River temperature. This criteria is well within the water quality standards. Saginaw Intervenors allege that Applicant will violate the law without setting forth one single fact in support of that contention. The contention does not specify how the violation will occur or why the supplemental cooling system will not prevent it or why, given the fact that the Plant can operate for extended periods of time, it cannot hold up release during the drought. The contention is frivolous and is irrelevant for the reasons stated above in the General Response (supra Page 103).

105. The Water Resources Commission has used the base year 1975 in its Certification. The use of the year 1975 as a base year has resulted in an inadequate analysis underlying the Certification. This is because subsequent to the year 1975, when Applicant's proposed Plant will be operating, tables of electric power use and projected growth of Dow Chemical indicate that Dow Chemical Company will be discharging substantially more pollutants into the River and, thus, the additive effect of Applicant's discharges will be far greater than has been assumed by the Water Resources Commission. As such, the Water Quality Certification is inadequate.

Response: Saginaw Intervenors unfortunately fail to reveal how tables of electric power use and projected growth of Dow Chemical can be converted to increased discharge of pollutants. As noted above in response to Contention 9, Dow Chemical has made a stipulation to the Michigan Water Resources Commission to substantially reduce its discharges. Saginaw Intervenors should be aware that Dow Chemical must receive approval from the Water Resources Commission pursuant to Section 8(b) of the Water Resources Commission Act prior to increasing its discharges to the River. Saginaw Intervenors' contention is based on the unreasonable contention that either Dow will willfully violate the law by increasing its discharges without approval or that the Water Resources Commission will grant approval to Dow in contravention of the law. This contention fails to set forth any facts to support it, is based on unsupported and unreasonable assumptions, is lacking in requisite specificity and is irrelevant for the reasons stated in the General Response (supra Page 103).

106. The Water Resources Commission has set a standard for the average content of dissolved oxygen in the River to be not less than five milligrams per liter and in any specific instance, not to be less than four milligrams per liter. Intervenors contend that this standard is insufficient. Moreover, assuming the validity of this standard, it is obvious from an examination of the statistics thus far provided that, currently, the standard is being violated and the additional discharges from the proposed Plant and the resultant expansion of Dow Chemical will inhibit and prevent any ability to meet or maintain the average and specific standard for the River with respect to the dissolved oxygen content.

Response: This contention repeats the unreasonable assumption regarding Dow's discharges, fails to indicate any facts in support of it, is lacking in specificity and is irrelevant as stated in the General Response (supra Page 103).

107. The Water Resources Certification notes major accidents which resulted in adverse effects upon the River, including fish kills on at least two occasions, to wit: on September 14, 1969 and July 27, 1971. The Water Quality Standards set for the River and the resultant Certification have failed to take into account adverse effects upon the River as a result of accidents of the frequency and severity as those exemplified and described in the Certification. As a result, the Certification and the setting of Water Quality Standards is based upon the unrealistic assumption that the River will only be subjected to the discharges as a result of normal operations. The failure of the Water Resources Commission and its Certification to factor a margin of error for its predictions of discharges into the River including, but not limited to, abnormal discharges, results in the Water Quality Standard being insufficient to protect the River in accordance with law.

Response: There is no reference to such accidents in the Water Quality Certification and in fact the certification was issued several months in advance of the July 21, 1971 accident.

This contention is based upon the theory that others will illegally discharge pollutants to the River and that Consumers Power Company must be restrained from making legal discharges in order to protect the River so that it can assimilate the illegal discharges. This contention is somewhat similar to denying the right of the citizens of the state to drive the highways of the state because they may be involved in an accident with someone violating the traffic laws. However, if an illegal accidental discharge of pollutants into the River should occur and if the operation of the pond discharge would exacerbate the effects of such discharge, Applicant is able to operate without discharging for a period of time sufficient for the pollutants to clear the river. This contention takes an absurd position, lacks specificity and is basically frivolous.

108. The Water Resources Commission has established that the coliform count in the River may not exceed 5,000 organisms per milliliter on an average count. There are included within the Water Resources Certification instances of coliform counts which exceed the established standard. Intervenors contend that the total coliform density in the River already exceeds the Water Resources Standards for intolerant warm-water fish and agricultural use during substantial portions of the year and that the operation of Applicant's proposed Plant and any expansion of Dow Chemical will compound these problems by virtue of additional discharges of sanitary wastes which increases the total coliform density.

Response: There are no instances of coliform exceeding 5000 organisms per milliliter in the certification. Any contention that the operation of the plant would increase the coliform count "by virtue of additional discharges of sanitary waste" is erroneous. As noted in the Order of Determination, the approximately 5,000 gallons per day of sanitary sewage will be treated at The Dow Chemical Company's waste water treatment plant. In such treatment coliform organisms are killed prior to discharge into the River. In addition, this contention repeats unreasonable assumptions as to Dow's intent. The contention is without foundation, is a mere conjecture, lacking in specificity and irrelevant for the reason stated in the General Response (supra Page 103).

109. The Water Resources Certification sets forth an established standard governing the River with respect to temperature limits for mixing zones and the edge of mixing zones. However, this Water Quality Standard is inadequate in that the standard does not define the mixing zone absolutely or specifically with respect to thermal discharges by Applicant or Dow Chemical. As such, the Water Resources Commission Certification represents inadequate protection of the River.

Response: No mixing zone is necessary for the bulk of Applicant's discharge since it will be within 1°F of River temperature. Although the Bullock Creek discharge will substantially exceed this differential, it will be a stream of a mere 3.2 cfs joining a River with average flow of 1,500 cfs. Its effect by any standards will be de minimis. Applicant will be required to have the mixing zone for the Bullock Creek discharge approved by the Water Resources Commission prior to operation. This contention is without merit, a collateral attack on the Water Resources Commission, unsupported by the facts and irrelevant for the reasons stated in the General Response (supra Page 103).

110. The Water Resources Commission has set forth in its Certification Water Quality Standards applicable to the River and other bodies of water for suspended colloids, residues, toxic and deleterious substances, nutrients, phosphates, ammonia, nitrates, sugars, taste and odor and pH. Intervenors contend that discharges from the proposed Plant and from the expansion of Dow Chemical resulting from operation of the proposed Plant will separately and/or in combination cause an increase in total amounts with respect to each of the above areas which will lead to absolute and relative values exceeding the Water Quality Standards and thereby contribute to the degradation of water quality of the River and its confluences.

Response: This is another collateral attack on the Water Resources Commission order unsupported by facts and ignoring the requirement that Dow obtain Water Resources Commission approval prior to increasing its discharges. It is also irrelevant for the reasons set forth in the General Response (supra Page 103).

111. The Regulatory Staff has made no independent review of the Water Resources Certification so as to form an independent judgment upon the Certification or the Water Quality Standards upon which it is based. Accordingly, the Regulatory Staff has failed to meet its obligations pursuant to the National Environmental Policy Act as interpreted by the Calvert Cliffs' decision.

Response: This contention should be stricken for the reasons stated in the General Response (supra Page 103).

112. Applicant and the Regulatory Staff assert there will be no adverse effect on the domestic water supplies in the greater Tri-City area as a result of the operation of the proposed Plant. However, neither Applicant nor the Regulatory Staff has presented and analyzed any data indicating survey of seeps or springs coming into the River. Furthermore, there is no data relating to a recharge of ground reservoirs by the River. The failure of Applicant to have analyzed seeps or springs or recharge of ground reservoirs indicate that Applicant and the Regulatory Staff's assertions with respect to effects, if any, on domestic water supplies are insupportable. Moreover, Intervenors contend affirmatively that based on available statistics that there will be an evaporative loss from the cooling pond to the River in the range of 20 to 35 cfs which will influence the total recharge of ground water reservoirs which will adversely affect the amount of water available to wells in the Tri-City Region, particularly, downstream from the proposed Plant. Thus, not only have Applicant and the Regulatory Staff failed adequately to analyze these crucial criteria, but the available statistics indicate that operation of the proposed Plant will have an adverse effect upon domestic water supplies.

Response: Seepage or springs draining into the river, as studied during site investigations, reflect the general surface water conditions in the region. These conditions indicate that excess surface water exists in the area downstream from the proposed Plant. This is also shown by the numerous artificial drainages (drainage ditches) which empty into the river. This is a result of a hydraulic gradient toward the river of the surface and near surface, free or perched groundwater. This shows that the river is not a source of recharge to these near-surface waters, but that groundwater actually is a source of recharge to the river.

The lower drift zone or artesian aquifer in the Midland area may be recharged from exposed moraines east of the Midland area. The river does not contribute to this aquifer as is shown by the piezometric head of the aquifer being higher than the water level of the river, again causing a

112. (Contd)

reverse hydraulic gradient from the aquifer to the river. Therefore, water taken from the river and consumed by evaporation from the pond does not affect recharging of the groundwater reservoirs downstream from the Plant. Applicant's conclusions regarding the domestic water supplies are supported and well-founded.

Even if the river did recharge the deep aquifer used for domestic wells, as the Intervenors contend, the small percentage (about 3%) of river flow consumed by evaporation from Plant operation would not affect the charging capability.

The above indicates that the Applicant has properly considered the effects of the river and the proposed Midland Plant on the domestic water supplies. Intervenors' contention is not valid nor based on any factual analysis.

113. Applicant has admitted that in its franchise area, including the area to be serviced by the proposed Plant, there exists agricultural land which is, from time to time, subject to irrigation. Applicant has not analyzed the effect which the generation of electricity and transmission of electricity from the proposed Plant will have upon the inability of owners of agricultural land to irrigate their crops. Grids and transmission lines will prevent the agricultural land situated near such grids and transmission lines from being irrigated by conventional sprinkler systems. The failure to have considered as a cost to the environment the amount of agricultural land which will be affected has not been considered in the cost-benefit analysis.

Response: The only transmission lines to be considered by the AEC are those lines between the Plant and the Applicant's system or to the Tittabawassee Substation. These lines do not pass over any agricultural land. Additionally, however, the Applicant has never restricted irrigation on land adjacent to Company-owned transmission rights of way. Land within the rights of way are leased at no cost for agricultural purposes to adjacent landowners at the request of these landowners. In all cases where right-of-way land is leased for agricultural purposes, Applicant has not prevented the lessee from using necessary irrigation within the rights of way. This contention has no factual basis and should be stricken.

114. Applicant and the Regulatory Staff have presented data on a probable maximum flood and assert that the design of the proposed Plant adequately safeguards the Plant from such a probable maximum flood. Intervenors contend, however, that an adequate environmental analysis is not possible unless it includes the probability and effects of a 10-year, 100-year, 500-year, 1,000-year or 10,000-year flood and that the 634 foot site elevation established for the proposed Plant will be insufficient to protect the proposed Plant in most of the above floods. In addition, Applicant's failure to discuss the range of possible floods has resulted in its failure to consider or take into account such a range of floods in connection with the design of the under-structure of the proposed Plant or the emergency measures which would be necessary to be taken into account in the event of such a flood or floods. In any such analysis, Applicant must set forth statistics upon which one can conclude what the degree of probability is with respect to each such flood and must also set forth what the consequences would be from each such flood. Without such information, an adequate cost-benefit analysis cannot be made.

Response: The Midland Plant is designed for Class I systems and structures to withstand the Probable Maximum Flood. The Probable Maximum Flood (PMF) is the largest flood conceivable for the river based on extreme rainfall (13.6 inches/24 hours) plus melting snow plus the effect of breeching of the four upstream dams. The Probable Maximum Flood cannot be given a recurrence interval but has larger river flow than any of the floods proposed by the Intervenor. Water surface elevation from this flood establishes the minimum plant grade and the design criteria for protection of Class I system and structures. Floods with greater recurrence which produce smaller river flows need not be considered separately in the safety design of Class I structures. Contrary to Intervenor's assertion, the Applicant has investigated the environmental effects of other floods (Reference PSAR Questions 2.3 and 2.4, Amendment No 6). In the case of the 100-year flood, the Applicant has widened the river for approximately a two-mile reach along the plant site

14. (Contd)

to accommodate a flow in the widened river channel and overbank area which would have a crest elevation, at the plant and upstream, not exceeding the 100-year flood prior to plant construction. The ten-year flood would stay within the river banks, and due to river widening, it would have a crest elevation less than the preconstruction ten-year flood.

The Intervenor's assertion that the plant foundation is not designed for the range of floods is false. Class I structures and systems are designed to withstand and be operable during a Probable Maximum Flood.

The degree of probability of a flood occurrence is simply what the design name implies; a 100-year flood is a flood with a probability of occurrence of one in 100 years.

Additionally, the issue of flooding is a radiological health and safety issue which Saginaw Intervenors had full opportunity to explore at that hearing and which was in fact explored by the Board (Tr 2456-59). This contention should be stricken as being too late.

115. Applicant and the Regulatory Staff have failed to consider in their environmental submissions any information or substantial information in each of the following areas. The failure to have analyzed and considered issues in such areas results in an insufficient environmental analysis of the construction and operation of the proposed Plant: (a) Social and philosophical effects of the displacement of people as a result of the construction and operation of the proposed Plant; (b) Wildlife aesthetics; (c) Population projections; (d) Chemical explosions at Dow Chemical and Dow Corning Companies; (e) Effects of synergism between radiation and chemicals; (f) Effects on fish and other organisms as a result of the operation of intake structures; (g) Decrease in property values as a result of each cost considered or failed to be considered; (h) Effects of the construction and operation of transmission lines, including but not limited to, effects in the following areas: (i) visual aesthetics; (ii) displacement of land; and (iii) effects on bird migration.

Respon e: The specific elements of this contention are treated seriatim as follows:

(a) Social and philosophical effects of the displacement of people as a result of the construction and operation of the proposed Plant;

This contention is frivolous, insufficiently specific, and without merit, particularly here where displacement has been completed except for the possibility of one additional displacement.

(b) Wildlife aesthetics;

This contention is insufficiently specific.

(c) Population projections;

Applicant has made population projections through 1980. See Appendix O to ASER. This contention is insufficiently specific.

(d) Chemical explosions at Dow Chemical and Dow Corning Companies;

This issue appears to be totally irrelevant to this proceeding

115. (Contd)

except to the extent it relates to Plant safety. This contention should be stricken as irrelevant and too late.

(e) Effects of synergism between radiation and chemicals;

This was an issue which Saginaw Intervenors were ordered to raise as a challenge to Part 20. This contention should be stricken as a result of their declining to make an offer of proof and as being insufficiently specific and unsupported by fact.

(f) Effects on fish and other organisms as a result of the operation of intake structures;

These effects have been discussed in answer to Questions 10 and 12 from the Staff, ASER Pages 6.10-1 and 6.10-2, and 6.12-1 and 6.12-2, and on Pages 90-91 of the Staff Draft Detailed Statement. Intervenors' contention is thus contrary to the facts, insufficiently specific and without merit.

(g) Decrease in property values as a result of each cost considered or failed to be considered;

There are no expected decreases in property values as a result of operation of the Plant.

(h) Effects of the construction and operation of transmission lines, including but not limited to, effects in the following areas: (i) visual aesthetics; (ii) displacement of land; and (iii) effects on bird migration.

These effects, except for bird migration, were covered in Section 4.6 and Appendices P, Q and R of the ASER. It is worth pointing out that use of a single 345 kV line eliminates the need for twelve 138 kV lines with resultant reduction in the necessary right of way width. There is no known restrictive effects on bird migration as a result

115. (Contd)

of presence of transmission lines. It is conceivable that occasional accidental collisions can occur in the same manner as with trees, buildings, bridges or natural obstacles. It is Applicant's experience (over 60 years) that collision with these overhead lines would be extremely rare. This contention is unsupported by fact, insufficiently specific, and without merit.

116. The National Environmental Policy Act requires sufficient information in order to make a cost-benefit analysis both qualitatively and quantitatively. The Regulatory Staff and Applicant have not presented sufficient information and have expressly declined to make qualitative and quantitative analyses of the various costs and benefits discussed in each of their submissions as well as those raised in this Statement of Contentions. Rather, Applicant and the Regulatory Staff have put forward certain value judgments and conclusions without assessing their economic cost or benefit and without relating such value judgments to the standards of the National Environmental Policy Act.

Response: Applicant has made a thorough discussion of alternatives and a cost-benefit analysis which fully complies with the requirements of the National Environmental Policy Act. See ASER Section 5.0. This contention is clearly frivolous, insufficiently specific and fails to set forth any facts in support of it. Additionally it is clearly a legal conclusion rather than a factual contention. For all of these reasons it should be stricken.

117. In certain instances, Applicant and the Regulatory Staff have provided dollar values but, once again, these dollar values are based upon vague or non-existent factual support.

Response: Where Applicant or the Staff have assigned dollar values they have either had a factual basis or represented a conservative judgment figure where no clear dollar value could be established. This contention contains no facts to support it, is insufficiently specific and should be stricken as being without merit.

118. Intervenors contend that because the procedural failures listed in Contentions 116 and 117, there is a failure to comply with the provisions of the National environmental Policy Act as well as a failure to provide a sufficient factual basis for this Board adequately to analyze the totality of the environmental impact of the direct and indirect effects of the proposed Plant.

Response: This is clearly a legal conclusion rather than a factual contention. It is unsupported by fact and insufficiently specific. It should therefore be stricken.

119. Intervenors also incorporate by reference each of the Contentions set forth in Appendix B to our Motions filed on September 30, 1971 and set forth in comments of the Environmental Defense Fund dated June 4, 1971.

Response: Saginaw Intervenors' Contention 119 attempts to incorporate by reference one of their previous filings and a previous filing made by the Environmental Defense Fund. Their decision to incorporate by reference the June 4, 1971 filing of the Environmental Defense Fund (EDF) is an excellent example of the seriousness with which they view their participation in this proceeding. The EDF filing was made prior to the Calvert Cliffs decision, prior to the radiological health and safety portion of the hearing, without awareness or discussion of Applicant's essentially zero liquid radwaste system and additional cooling system on the pond blowdown and prior to the ASER and the Draft Detailed Statement. It is in essence a largely obsolete and irrelevant statement of comments. The siting location section of these comments was thoroughly explored in the radiological health and safety hearing and substantial additional information on fogging and ecological parameters of the site as requested in the comments have been furnished in Sections 3.1, 3.2 and 4.3 and Appendices C-L and O of the ASER. The comments on radiation have been answered in ASER §4.2 and Appendix A. The essentially zero liquid radwaste system has eliminated any significant quantities of radioactivity from the Plant discharge and the process steam issue was explored in the radiological health and safety portion of the hearing. Transportation of radioactive material has been covered in Section 4.5 of the ASER and areas beyond certain points of the fuel cycle have been excluded from the issues in the proceeding. The supplemental cooling system on the pond blowdown has removed any reasonable concern for thermal discharges.

119. (Contd)

Handling and transportation of spent fuel elements was partially a matter of concern at the radiological health and safety portion of the hearing and is further addressed at Sections 4.2 and 4.5 of the ASER. Chemical wastes have been thoroughly addressed in answers to Questions 3, 4 and 11 of the AEC staff. See ASER, Pages 6.3-1 - 6.4-5; 6.11-1 - 6.11-2. Meteorology was covered at the radiological health and safety portion of the hearing and in Section 4.3 and Appendix O to the ASER. Water supply was addressed in the ASER, Pages 3.2-2 and 3.2-3. Alternatives have been extensively covered in the ASER, §§5.1-5.4. The EDF filing was a series of general comments about areas that should be covered and most of which have now been covered. It is in no sense a statement of contentions and is worthless as such where so many things have occurred since its filing.

Exhibit B to Saginaw Intervenors Motions of September 30, 1971 (we presume this is what is meant by "Appendix B" in the contention) is merely a statement of broad issues which Saginaw Intervenors wished to see considered. It was and is not a statement of contentions. It is, as it states, lacking in "any specific detail." It was, as it states, merely a preliminary statement of issues which they wished to see considered pending receipt of further filings of Applicant and the Staff. They have received such further filings and should not now expect Applicant to pick and choose amongst the issues stated in their previous filings to determine which have been succeeded by the instant contentions and to wonder why Saginaw Intervenors feel that issues not contained in the instant contentions have not been satisfied by the ASER and the Draft Detailed Statement.

119. (Contd)

Contention 119 is thus not a contention but a mere reference to past comments. It is totally useless as an indication of Saginaw Intervenors' contentions on matters in this proceeding being merely general statements unrelated to the material filed in this proceeding by Applicant and Staff. As such it should be stricken.

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