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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISION
BEFORE THE ATOMIC SAFETY LICENSING BOARD

In the Matter of
Consumers Power Co
(Midland Plant Units I and II)

Docket Nos 50-329 OL, OM
50-330

Consumers Power Company's Response to Sinclair's "Motion to Compel Applicant to Answer Her Second Set of Interrogatories Based on New Information" (Dated October 4, 1982).

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PDR ADOCK 05000329
G PDR

October 19, 1982

mi1082-2941a100

DS03

BACKGROUND

On September 13, 1982, the Applicant responded at some length to discovery questions of Mrs Sinclair relating to her Contention 5 on cooling pond thermal performance. A short time later, Applicant supplied a large volume of documents under a request relating to the same subject. On September 13, 1982, Mrs Sinclair filed further discovery questions, styled as a "Second Set of Interrogatories Based on New Information," allegedly "based on new information found in the FES". On September 17, 1982, the Applicant objected to the interrogatories on grounds, inter alia, that they are beyond discovery permissible under Orders of the Hearing Board, are untimely, and lack pertinence to any admitted contention. Mrs Sinclair filed the present motion seeking to compel responses to these interrogatories, arguing that they are relevant to admitted Contention 5 and that the Board implicitly re-opened discovery relevant to Contention 5 (based upon new information in the FES.) As explained more fully below, the interrogatories in question are vague and incomprehensible, irrelevant to Sinclair Contention 5, or unrelated to new information in the FES. Therefore, even if Mrs Sinclair's theory that the Board "implicitly" re-opened discovery is correct, the present interrogatories are defective and should be disallowed.

ARGUMENT

Interrogatory No 1 asks for the basis for Applicant's "data that fog will be formed over the lake and advected inland at temperature of (-18°C, 0°F), to

which the Staff take exception". This interrogatory is incomprehensible and untimely.

The question begins by assuming that the Applicant has certain "data". We are unable to determine what data is questioned. The only hint given in the Interrogatory is a reference to fog formation and advection inland at temperatures of -18°C, which, apparently, is an inaccurate recitation of a statement made by the Staff in the DES. In the DES, the Staff states, "Dresden studies indicate that when the air is very cold (below-18°C 0°F) and the water surface very warm (20° to 25°C), the fog over the pond will become very dense" (emphasis supplied). (DES, p 5-7, attached)

Even if the term "data" could be interpreted as "statement", the Applicant never made the statement (incorrectly repeated); rather, it was made by the Staff. In short, this question, after misrepresenting a statement made by the Staff, refers to the statement as "data", attributes the data to the Applicant and asks the Applicant for the basis for such data. The question also assumes that the Staff takes exception to this data, an unusual comment in light of the fact that the Staff itself made the statement to which the question refers.

Also, the answer to our guess as to what the question means is given in the DES itself. The DES indicates that the referenced conclusion is based on "Dresden studies" carried out by the Staff. If Mrs Sinclair wished to inquire into the Staff's Dresden study, she should have directed a question to the NRC

Staff at an appropriate time (when the DES was issued.) Thus, this question is incomprehensible, untimely, and apparently directed to the wrong party.

Interrogatory 2 asks for the basis of the Applicant's calculations that assume wind direction and air temperature are not correlated. This question is irrelevant to Sinclair Contention 5.*

The background of this question is apparent from the DES/FES, - comment dialogue. The Staff, in the DES, made the statement quoted above (under the discussion of Interrogatory 1 at p 2, supra) relating to very dense fog generation. The Applicant responded with a remark that even if the Staff's opinion as to pre-condition of very dense fog is accurate, such conditions coupled with unfavorable wind directions only exist for seven hours per month. This conclusion was indicated to be based upon meteorological data and the predicted monthly average pond temperature (FES, p A 43, attached).

Although the predicted monthly average pond temperature may be relevant to Mrs Sinclair's contention, her question is directed to why the Applicant treated wind direction and temperature as independent variables in its DES comment. This has nothing at all to do with the use of studies from different climatic regions in the Staff's DES analysis. The question is irrelevant to Contention 5 and improper.

* Contention 5 alleges that the Staff "DES is deficient in that it continues to base its analysis of the cooling pond's effectiveness in controlling thermal discharges and ice and fog generation on cooling pond performance in a substantially different climatic region." The contention is not a general inquiry into fogging and icing at the Midland Site.

Questions 3-5 are general inquiries, totally unrelated to new information in the FES. Question 3 asks for the heat load of the pond; Question 4 for how the figure in 3 was determined; Question 5 for what experience, documents, or other data were used to get this figure. These questions, on their face, are improper and untimely. No excuse is offered for filing general questions, not tied to new information in the FES, at this late date.

Question 6 is based on Questions 1-5, which, as asserted above, are themselves improper. Thus, the objections applicable to Question 1-5 are equally germane to Question 6.

Question 7 asks if any models have been successfully applied in actual practice. This, again, is discovery unrelated to new information in the FES.

Questions 8 inquires into actions to mitigate increased fog and ice. This question, apart from lacking pertinence to new information in the FES, is also irrelevant to Sinclair Contention 5, which as previously indicated, deals with alleged inadequacies in the Staff's prediction of thermal or fog impacts because of faulty reference data. The existence and nature of actions to mitigate fog and ice generation have no tendency to prove or disprove the truth of the contention, and are thus irrelevant to it. Apparently, the question amounts to an effort to expand Contention 5 into something akin to Mr Marshall's former contention on fogging and icing. The Board's pre-hearing Conference Order does not support such an expansive interpretation of Contention 5. Even if it did, however, this question is untimely and not based on any revelations in the FES. (The DES, published in February of 1982, discusses mitigative actions to almost the same level of detail as that of the FES. In any event, this question does not address any information regarding

mitigation newly provided in the FES. See DES p 5-7, FES pp 5-6, A-43, all attached.)

Question 9, which asks whether any action short of enlarging the pond would reduce pond temperature, is untimely and improper. No reference in the FES is cited as new information in support of asking the question, which, again, appears to be general discovery.

For the reasons asserted above, the interrogatories for which responses are sought are objectionable, even if the Board implicitly re-opened discovery limited to new information in the FES. Therefore, Mrs Sinclair's motion to compel should be denied. (Although the argument was not made explicitly above, the Applicant does not waive its objection on the ground that the Board never permitted discovery on the basis of new information in the FES.)*

Respectfully submitted

James E Brunner

James E Brunner

One of the Attorney's for
Consumers Power Company

* In view of the extensive discovery already undertaken by Mrs Sinclair on this subject and others, it is not inconceivable that the Board would require a prior showing that the information forming the bases of further questions is, in fact, new. Neither Mrs Sinclair nor any other party ever asked the Board for further discovery on the basis of new information, or ever sought to make such a showing.

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DES

about 186.8 m (613 ft) MSL in the old channel just upstream of the Tittabawassee River. At this same elevation, the relocated channel can carry a discharge about 78% greater than the 100-year flood. Since the relocated channel can carry a greater discharge, the water level resulting from a 100-year flood on Bullock Creek will be lower than it was under pre-project conditions.

The Midland Plant is designed to withstand the flooding effects of a PMF, a much more severe event than the floods discussed in the Executive Order. Additionally, since the altered 100-year flood level in the Tittabawassee River will only be about 0.06 m (0.2 ft) higher and the 100-year flood level in Bullock Creek will be lower than before, the staff concludes that the mitigative actions which have been provided are acceptable and the operation of the Midland Plant will comply with the intent of Executive Order 11988.

5.4 AIR QUALITY

5.4.1 Fog and Ice

The data on fogging available to the staff at the time the FES-CP (Sec. V.A.2) was prepared indicated that fog from cooling ponds usually did not extend more than about 100 m (300 ft) inland before evaporating, becoming quite thin, or lifting to form a low stratus cloud deck (Ref. 1); these data were derived from observations at cooling ponds with considerably smaller air-water temperature differentials than are now expected at the Midland pond. These observations also indicated that during cold weather, rime ice was deposited from the fog on elevated objects near the ponds. Based on these limited observations, the staff concluded that there would be no significant fogging and icing impacts. However, new information has now become available which causes the staff to modify its conclusions concerning the extent and impact of fog from the Midland cooling pond.

Currier et al. (Ref. 2) and Hicks (Refs. 3,4) have developed models to predict the occurrence and density of steam fog over cooling ponds. These models, which have been confirmed by observations over operating cooling ponds in Illinois and Arizona, predict that fog density increases as the air-water temperature difference increases. Observations made at the Dresden nuclear plant in Illinois since it began closed-cycle cooling operations similar to those that will be used at Midland indicate that there is an increase in the frequency of steam-fog over the water surface and a major increase in the density of the fog as the air-water temperature difference increases (Refs. 3-7). During cold weather, formation of ice on elevated objects also increases in frequency and amount as the air-water temperature difference increases, and very light snow has been observed to fall from the plume downwind of the pond (Refs. 5-7).

The Dresden studies indicate that when the air is very cold [below -18°C (0°F)] and the water surface very warm [20° to 25°C (70° to 80°F)], the fog over the pond will become very dense. (Dense steam fog at Dresden can momentarily reduce visibility to near zero on a road about 100 m (300 ft) south of and parallel to the edge of the cooling pond.) Wind may carry this fog inland some distance. There are no proven mathematical models to predict the inland penetration of such fog, but limited observations indicate that fog can move inland as much as 1.6 to 3.2 km (1 to 2 mi) (Refs. 2,5). However, the restriction to visibility and the icing effects in the fog zone decrease rapidly as the fog travels inland.

DES

Based on the above information, the staff now expects a more severe local steam-fog effect near the Midland cooling pond than was predicted in the FES-CP. Because the heat load on the pond will be higher than that at Dresden, water temperatures in the Midland pond will be even hotter than those at Dresden. The staff is of the opinion that dense steam fog will be quite common over and near the Midland cooling pond in the cooler part of the year (November through March). During colder winter periods, fog over and just downwind of the water surface is expected to be very dense.

Based on the above considerations, the staff expects that plant operation will result in frequent periods of dense fog over and south of Gordonville Road during cool weather. During some of these foggy periods, visibility could be sufficiently reduced to create traffic hazards.

No icing of clear road surfaces should occur during cold weather, but deposition of water or light snow on a snowpacked or icy road surface may further decrease traction.

The staff expects that in subfreezing temperatures, thick deposits of light, friable rime ice will form on elevated objects within the steam-fog zone. These deposits are expected to be limited to areas within 200 m (600 ft) of the lake. Because of the known low weight and the crumbly nature of these ice accumulations, the staff expects that little damage will be done to trees, vegetation, wires, or structures.

The state-of-the-art does not permit a more precise assessment of the fogging and icing impacts of the operation of the Midland cooling pond than given above. For this reason, the staff recommends that the applicant initiate a fog-monitoring program for the highways in the area, particularly Gordonville Road, to determine the frequency and density of pond-related fogs that could produce highway-safety problems. As is summarized in Section 6.1, the applicant is required to initiate actions to mitigate untoward impacts that may occur as a result of operation of the plant. If traffic hazards are observed as a result of pond operation, mitigative measures could include erection of traffic signs, road centerline and edge lights, and planting of trees as a fog barrier between the pond and the road.

5.4.2 Emissions and Dust

5.4.2.1 Emissions

The sources of nonradioactive gaseous emissions during normal operation of the plant will be testing of the standby diesel generators and the one fire-protection diesel and use of the two auxiliary boilers (Sec. 4.2.6.3). Since the diesels will have limited use (1 hr/mo for each of the four standby generators and 26 hr/yr for the fire-pump engine) and since the auxiliary boilers will use natural gas, the staff has determined that the impact on local air quality will be minimal and that no violations of air quality standards will result from plant operation.

Additionally, the production by the Midland Plant of process steam for Dow Chemical Company (see Sec. 2.5) will improve air quality. The process steam is now produced by Dow with fossil-fueled equipment, an air-pollution source that will be replaced by nuclear when Midland goes into operation.

FES

The lower 1100-m (3500-ft) reach of Bullock Creek extending upstream from the Tittabawassee River was relocated as shown in Figure 5.1. A 100-year flood discharge on Bullock Creek was determined to result in a flood elevation of about 186.8 m (613 ft) MSL in the old channel just upstream of the Tittabawassee River. At this same elevation, the relocated channel can carry a discharge about 78% greater than the 100-year flood. Since the relocated channel can carry a greater discharge, the water level resulting from a 100-year flood on Bullock Creek will be lower than it was under pre-project conditions.

The Midland Plant is designed to withstand the flooding effects of a PMF, a much more severe event than the floods discussed in the Executive Order. Additionally, since the altered 100-year flood level in the Tittabawassee River will only be about 0.06 m (0.2 ft) higher and the 100-year flood level in Bullock Creek will be lower than before, the staff concludes that the mitigative actions which have been provided are acceptable and the operation of the Midland Plant will comply with the intent of Executive Order 11988.

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Currier et al. (Ref. 2) and Hicks (Refs. 3,4) have developed models to predict the occurrence and density of steam fog over cooling ponds. These models, which have been confirmed by observations over operating cooling ponds in Illinois and Arizona, predict that fog density increases as the air-water temperature difference increases. Observations made at the Dresden nuclear plant in Illinois since it began closed-cycle cooling operations similar to those that will be used at Midland indicate that there is an increase in the frequency of steam-fog over the water surface and a major increase in the density of the fog as the air-water temperature difference increases (Refs. 3-7). During cold weather, formation of ice on elevated objects also increases in frequency and amount as the air-water temperature difference increases, and very light snow has been observed to fall from the plume downwind of the pond (Refs. 5-7).

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FES

penetration of such fog, but limited observations indicate that fog can move inland as much as 1.6 to 3.2 km (1 to 2 mi) (Refs. 2,5). However, the restriction to visibility and the icing effects in the fog zone decrease rapidly as the fog travels inland.

Based on the above information, the staff now expects a more severe local steam-fog effect near the Midland cooling pond than was predicted in the FES-CP. Because the heat load on the pond will be higher than that at Dresden, water temperatures in the Midland pond will be even hotter than those at Dresden. The staff is of the opinion that dense steam fog will be quite common over and near the Midland cooling pond in the cooler part of the year (November through March). During colder winter periods, fog over and just downwind of the water surface is expected to be very dense.

Based on the above considerations, the staff expects that plant operation will result in frequent periods of dense fog over and south of Gordonville Road during cool weather. During some of these foggy periods, visibility could be sufficiently reduced to create traffic hazards.

No icing of clear road surfaces should occur during cold weather, but deposition of water or light snow and rime ice falling from wires and vegetation on a snowpacked or icy road surface may further decrease traction.

The staff expects that in subfreezing temperatures, thick deposits of light, friable rime ice will form on elevated objects within the steam-fog zone. These deposits are expected to be limited to areas within 200 m (600 ft) of the pond. Because of the known low weight and the crumbly nature of these ice accumulations, the staff expects that little damage will be done to trees, vegetation, wires, or structures.

The state-of-the-art does not permit a more precise assessment of the fogging and icing impacts of the operation of the Midland cooling pond than given above. The applicant initiated a two-year preoperational fog and ice monitoring program to measure the frequency, extent, and opacity of pond-induced steam fog and icing near the cooling pond (ER-OL, Sec. 6.1.3.1. The applicant is committed to resume this monitoring program after the first unit is operational (ER-OL, Sec. 6.2.3.1.2, and Consumers Power Co. comment letter, April 2, 1982, Appendix A). The applicant is also committed to take mitigative actions in the event that hazards to traffic result from operation of the cooling pond (ER-OL, Section 5.1.4.2; Consumers Power Co. comment letter, (April 2, 1982, Appendix A). If traffic hazards are observed on any of the highways in the area as a result of pond operation, mitigative measures could include erection of traffic signs, road centerline and edge lights, and planting of trees as a fog barrier between the pond and the road. Should the density of the steam fog under extreme conditions be sufficient to pose a serious traffic hazard despite the mitigating measures discussed above, the option of closing the road should be considered.

5.4.2 Emissions and Dust

5.4.2.1 Emissions

The sources of nonradioactive gaseous emissions during normal operation of the plant will be testing of the standby diesel generators, the security system diesel, and the one fire-protection diesel and use of the two auxiliary boilers

Section 5.4.1 Fog and Ice

Para 1-8 (p 5-7, 8)

Comment - The Applicant is currently implementing a Fog and Ice Monitoring Program as defined in the ER-OL Sections 6.1.3.1.8 and 6.2.3.1.2. The Applicant's monitoring program will establish preoperational conditions as well as measure conditions after the plant is in operation. The DES-OL fails to mention the existence of this ongoing monitoring program.

#78

The establishment of the monitoring program was based on the recognition that on-site field data are needed because there are no mathematical models capable of reliably predicting fogging conditions during operations. The Staff conclusion that frequent periods of dense fog will occur on Gordonville Road seems premature and is based on modeling results which appear to be very conservative. As noted in the DES-OL, very dense fog is only expected during the coldest part of the year when the differential temperature between the air and pond water is 70°F to 80°F. For example, during the period of December 1, 1980 through March 31, 1981 there were only 34 hours (approximately 1 percent of the time) in which a differential temperature of 70°F or more would have existed between the predicted monthly average pond temperature and the actual air temperature. Not only must this differential temperature exist, but the winds must also be from a northerly direction for fog to be carried over Gordonville Road. Based on meteorological data available from instruments located at the Midland Plant, northerly winds occur approximately 24 percent of the time during the December 1, 1980 to March 31, 1981 period. Thus, the joint probability of occurrence of the two conditions required for fogging at Gordonville Road would be 0.24 percent or approximately 7 hours per winter season based on the 1981 meteorological data. This probability assumes that both conditions (differential temperature and wind direction) occur simultaneously which is not always the case.

Finally, the Staff's predicted impacts are based on very limited observations at other locations which may not be representative of conditions at Midland and the conclusions appear to represent a pessimistic interpretation of these limited observations. The two units at Dresden produce about 1618 MWe with heat dissipation via a 1275 acre cooling pond. Midland Plant produces 1357 MWe with heat dissipation via a 880 acre cooling pond. The ratios of pond area to electrical output are similar for these two plants and pond temperatures would be only slightly

higher at Midland. The Dresden Station also uses spray modules for additional cooling which increases the water vapor emissions and increases fog and ice potential.

For the above reasons this Section of the DES-OL should be rewritten to fairly characterize the state of knowledge, the uncertainty associated with the predictions and a more representative impact prediction made.

#79

Para 7, Sentence 2 (p 5-8)

Delete - ..."lake."

Insert - pond.

#80

Para 8, Sentence 2 (p 5-8)

Delete - ..."density"...

Insert - extent

#81

Section 5.4.2.1 Emissions

Para 1, Sentence 1 (p 5-8)

Add - one security system diesel and three temporary high pressure boilers for testing.

Section 5.5.1.2 Cooling Pond

Para 1 (p 5-9)

#82

Comment - Applicant does not believe that winter starvation is a concern because similar overwintering situations in Michigan show that waterfowl leave to obtain food elsewhere before starvation becomes a problem.

#83

Comment - Significant gull overwintering seems probable (References 24, 25 for DES-OL, Section 5).

#84

Comment - Heated water itself would contribute little to waterfowl disease.

Section 5.5.1.3 Transmission Corridors

#85

Para 1, Sentence 1 (p 5-10)

Delete - ..."maintenance clearing"...

Insert - vegetation control

CERTIFICATE OF SERVICE

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I hereby certify that copies of the attached Response of Consumers Power Company to Mary Sinclair's Motion to Compel of October 4, 1982 were sent by U S Mail, first class, postage prepaid, to the attached service list this 15th day of September.

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