SEP 9 1974

DOCKET NOS.: 50-329 AND 50-330

APPLICANT : CONSUMERS POWER COMPANY

FACILITY : MIDLAND PLANT, UNITS 1 AND 2

SUMMARY OF MEETING TO DISCUSS APPLICANT'S PROCEDURE FOR ANALYSIS OF THE MIDLAND EMERGENCY COOLING POND AS APPLICABLE TO REGULATORY GUIDE 1.27

Representatives of the Regulatory staff and the Consumers Power Company met in Bethesda, Maryland on August 28, 1974. An attendance list is enclosed.

Meteorological Data Base Selection

The applicant indicated that the meteorological data required for simulation of surface heat exchange processes for a cooling pond are dry-bulb temperature, humidity, wind speed, cloud cover, and solar radiation. The above parameters would be referred to as the "complete set" of data. A complete set of meteorological data for Lansing, Michigan covers a period from 1910 to 1973. For Saginaw, Michigan, the complete set of data covers the period from 1938 to 1973. Comparisons of maximum 1-day and 30-day periods of equilibrium temperature and natural evaporation rate, and frequency distributions of equilibrium temperature, natural evaporation rate and wind speed, indicate the Lansing meteorology will be conservative with respect to both thermal performance and 30-day evaporative water losses. These results and the fact that there is an additional 28 years of complete data make Lansing a preferable choice as a data base, even though Saginaw is only about 15 miles from the site as compared to Lansing which is about 60 miles. The applicant indicated that 15 years of the Lansing data is available on magnetic tape and inquired if the Regulatory staff would approve the use of this 15 year period as input for the applicant's analysis. The staff indicated the Lansing 15-year data was acceptable provided the applicant made an examination of other data to ensure the data base to be used by the applicant included maximum recorded values.

The analysis of the full period of complete meteorological data will involve identifying the following periods:

1. Several of the top ranking 1-day average and 30-day average periods of highest equilibrium temperature.

2. The highest 30-day average period of dew point depression (dry-bulb) temperature and dew point temperature).

3. The highest 30-day average period of natural evaporation rate.

4. The highest 30-day average period of wind speed.

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Pond Performance Analysis

The applicant indicated that pond performance will be analyzed with the PLGSPR cooling pond model.

The initial temperature of the emergency cooling pond will be determined by transient simulation of the operation of the large cooling pond. The applicant indicated that this approach is necessary because the emergency pond is located in the bottom of the cold leg of the large cooling pond. The large pond operation will be simulated for a 30-day period using daily averaged meteorological parameters corresponding to the 30-day period with the highest equilibrium temperature. The highest simulated pond outlet temperature during this 30-day simulation period will be used as the initial emergency pond temperature.

The meteorology input for simulation of the emergency pond performance was indicated to be as follows:

1. Time period (0-1 day) average 1-day meteorological parameters corresponding to the day with the highest equilibrium temperature.

2. Time period (1 day - 30 days) average 30-day meteorological parameters corresponding to the 30-day period with the highest equilibrium temperature.

Emergency pond performance will be simulated for meteorology corresponding to as many of the high ranking 1-day and 30-day periods of equilibrium temperature as is necessary to insure that the highest pond outlet temperatures are determined. Once the worst case 1-day and 30-day meteorology periods, with respect to high pond outlet temperature, are determined, the actual hourly meteorological data will be used to investigate the effect of diurnal fluctuations. Emergency pond performance will be simulated for the LOCA accident occurring at various times during the day in order to be certain that the highest possible peak pond outlet temperature is determined.

Analysis of pond evaporation losses will be done for two cases. The first will utilize 30-day average meteorological parameters corresponding to the 30-day period with maximum dew point depression. The second will utilize 30-day average meteorological parameters corresponding to the 30-day period of maximum natural evaporation rate. For each case, the wind speed used will be the higher of the following two.

1. The highest average daily wind speed during the 30-day period of maximum dew point depression for the first case, or during the 30-day period of maximum natural evaporation rate for the second case.

2. The maximum 30-day average wind speed for the full period of complete meteorological data.

The larger value of total evaporation determined for the two cases analyzed will be used for design.

Wind Speed Functions

The mathematical formulations of evaporative and conductive heat loss from a water surface involve the concept of a wind speed function. The applicant indicated that Ryan's function provides the most accurate estimate of pond temperature performance, but for the analysis of the Midland emergency cooling pond, Brady's wind speed function would be used as it is more conservative than Ryan's function.

Cooling Pond Model

The applicant stated that the PLGSPR model simulates the operation of a stratified, two-layer cooling pond with horizontal temperature gradients in the upper and lower layers, and that the flow regime is two dimensional. Surface heat exchange is computed on a term by term basis (solar radiation, atmospheric radiation, back radiation, evaporation, conduction) and does not make use of the linearized approach.

The Regulatory staff indicated whereas the PLGSPR is a new model, they would request that the applicant make an effort to verify the model with available physical data and by field investigations.

Wind Shadow Effects

The applicant indicated that an attempt will be made to analyze wind-shadowing effects on the emergency cooling pond.

Conclusions

The Regulatory staff stated the applicant's proposed analysis of the Midland Emergency Cooling Pond provided an acceptable basis with respect to Regulatory Guide 1.27.

Original Signed by

Leon B. Engle, Project Manager
Light Water Reactors Branch 2-3
Directorate of Licensing

Enclosure:
List of Attendees

OFFICE ▶	x7886/LWR 2-3					
SURNAME ▶	LBEngle:cjb					
DATE ▶	9/6/74					

MEETING WITH CONSUMERS POWER COMPANY
MIDLAND PLANT, UNITS 1 AND 2
HELD AUGUST 28, 1974

LIST OF ATTENDEES

Atomic Energy Commission

R. Codell
T. Johnson
J. Fairobent
D. Schreiber
L. Engle
W. Bivins

Consumers Power Company

R. Teuteberg
R. Bauman

Bechtel Associates

F. Wind
T. Vanvick
J. Hurley

MIDLAND PLANT, UNITS 1 AND 2 MEETING SUMMARY

DISTRIBUTION:
Dockets (2)
AEC PDR (2)
LPDR
LWR 2-3 Reading
L Reading
AGiambusso
RSBoyd
SVarga
DEisenhut
RKlecker
RP ADs
RP BCs
FSchroeder
TR ADs
TR BCs
RO (3)
RS (3)
OGC
FMiraglia, EP-3
LEngle, LWR 2-3
EGoulbourne, LWR 2-3
RCodell
TJohnson
JFairobent
DSchreiber
WBivins