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 CURTIS, N. W. Pennsylvanial Power & Light Cbl.
 RECIPIENT NAME: RECIPIENT AFFILIATION:
 SCHNEIDER, A. Licensing Branch 2:

SUBJECT: Forwards responses to questions re ultimate heat sink test plan. Calibrated temp measuring device will be used to measure temp in main stilling well in pumphouse. Tests will be performed during July or Aug 1983.

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MAY 10 1983

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2,
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
ULTIMATE HEAT SINK TESTS
ER 100450 FILE 841-2
PLA-1647

Docket Nos. 50-387
50-388

Dear Mr. Schwencer:

Attached are the responses to your staff's questions on the ultimate Heat Sink Test Plan for Susquehanna SES.

The ultimate Heat Sink Tests will be performed during July or August 1983.

Very truly yours,

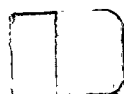
N. W. Curtis
Vice President-Engineering & Construction-Nuclear

Attachment

cc: R. L. Perch - NRC

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PDR



QUESTION 1.

Previous spray pond and cooling pond tests under closely-controlled conditions have demonstrated that the change in pond water level is not in itself an accurate indicator of water loss. Since in most cases the water level change will be only a few inches during a test, thermal expansion or contraction in the pond can cause a serious error unless the pond is isothermal. Draft NUREG-0858 points to this problem in Chapter 6.3. Note also references 12 and 14 to this report.

It would be best to use some sort of measuring device which would be insensitive to the thermal expansion of water, or at least to closely monitor the temperatures in the stilling wells and tubes for the hook gages in order to correct for thermal expansion.

RESPONSE

A calibrated temperature measuring device will be used to measure the temperature in the main stilling well in the pumphouse. Readings will be taken at least as often as the pond level is recorded.

QUESTION 2.

Differing surface heat transfer formulas require wind speeds measured at different heights above the water surface. The NRC spray pond model uses a 2 meter height. Please measure wind speeds at this height, if possible, or provide a range of heights from which a 2 meter value can be interpolated.

RESPONSE

Per discussions with the NRC, they withdrew their request for wind speeds at a height of 2 meters. The test procedure specifies that wind speed data be collected at a 6 foot height which is satisfactory.

QUESTION 3.

It is not entirely clear from the test plan report how the evaporation pans will be employed to provide the necessary data on evaporative losses. Please clarify the following:

- a) What assurances are there that the water in the pans will be at the same temperature as the pond water?
- b) Will drift from the sprays or wind waves affect the water loss measurements?
- c) Will pan coefficients or other formulas be used to interpret the evaporative loss?

RESPONSE

- a) To assure that the water in the evaporation pans is at the same temperature as the pond, the temperature in the pans will be measured by a calibrated device and recorded. This temperature will be read when the pan hook gages are read.
- b) The evaporation pans will be protected from measurement errors due to waves splashing into the pans and by drift adding water to the pans by checking for these concerns when the measurements are taken. The pan by design should preclude the wave action causing a problem. If drift is detected, by being able to feel it or see it dropping into the pan, the pan will be moved to a location in the pond unaffected by drift.
- c) Pan coefficients will not be used to interpret the evaporative loss. Evaporative loss will be determined by the level drop in the pans.

QUESTION 4.

In order for the staff to use the pond results for model confirmation, please provide the data from the test in the following way?

At regular intervals (preferably 1/2 hour) provide:

- a. time of day and elapsed time
- b. solar incident, and/or net radiation
- c. cloud cover if available (tenths)
- d. ambient wind speed away from pond area (2 meters or range of heights)
- e. wind direction
- f. wet bulb temperature (2 meters or range of heights)
- g. dry bulb temperature (2 meters or range of heights)
- h. flow rate through sprays
- i. heat loads
- j. barometric pressure

RESPONSE

- a. time of day and elapsed time - the time of day will be reported in 5 minute intervals.
- b&c. solar incident and/or net radiation and cloud cover - the incident radiation will be continuously recorded by a pyranometer. The cloud cover can be determined by the photographs of the sky taken every daylight hour.
- d. ambient wind speed away from pond area - (2 meters or range of heights) - this data will be measured at a 6 foot height near the pond. To supplement this met tower data from the tower nearest the pond will be provided.
- e. wind direction - response is the same as "d".
- f. wet bulb temperature - response is the same as "d".
- g. dry bulb temperature - response is the same as "d".
- h. flow rate through sprays - the total flow rate to the sprays will be measured by an orifice and recorded.
- i. heat loads - the heat loads can be calculated from the flow rate and temperature differences.
- j. barometric pressure - will be provided.

QUESTION 5.

Since you used Harrisburg Airport data in your model tests, provide data from this station for the same period of the tests in order to correlate the data bases.

RESPONSE

Per discussion with the NRC staff, since the Ultimate Spray Pond Heat Tests are of short duration, the Harrisburg Airport data would not give a meaningful correlation. Therefore the Harrisburg Airport data will not be provided.

QUESTION 6.

The final report should include measurements of drop size distributions which have been taken.

RESPONSE

The spray drop size distribution is contained in FSAR Tables 9.2-24 thru 9.2-26.

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