

of thermal discharges. EPA's ban on new cooling lakes (and new plants on existing lakes) will waste water and block its "effective utilization," thus frustrating water conservation efforts and impeding sound water resource management.

Because such lakes rely less heavily than towers on evaporation for cooling, they use about 50% less water for cooling purposes than towers or spray ponds. Lakes, of course, do involve evaporation unrelated to cooling. But the total natural surface evaporation from a multi-purpose impoundment obviously cannot be charged to the cooling function. It must be allocated among all the uses of the water -- for instance, municipal and agricultural. In such cases, the water consumption properly attributable to cooling "is merely an incremental amount equal to that which would take place with once-through cooling," resulting from the enhanced evaporation caused by higher water temperatures.

Unlike a cooling tower, a lake will catch and retain water from direct rainfall and from runoff. In some areas, cooling lake recharge from direct rainfall on the impoundment may equal or exceed natural surface evaporation. (R. 8941) And even in areas with less rainfall, the ability of an impoundment to store runoff that would otherwise be lost often compensates for the added surface evaporation, both natural and heat-induced. (R. 20163-64; Ref. 151 at 21)

Use of cooling towers, in any event, will frequently require construction of water storage impoundments simply to assure an adequate supply of made-up water for the towers,

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or to compensate for the additional consumption during periods of low river flow. Make-up impoundments will be required particularly on the intermittent streams of the Southwest, the heavily-loaded rivers of the Northeast, and perhaps, the streams of the coal-rich piedmont and mountain area in the eastern United States. Where these impoundments are required, "the consumptive use of water in the cooling tower, plus the (evaporative) losses from the water storage pond, is generally greater than the losses from (a lake used for cooling)."

(R. 35114).

In sum, an examination of net overall water loss -- the relevant parameter in light of growing concern over impending water shortages -- makes it apparent that cooling lakes consume less water than evaporative towers.

In many instances, moreover, utilities have built impoundments, sometimes in conjunction with water resource development agencies, with long-range plans for future power plants to use such lakes for cooling. Now EPA says these new plants must have cooling towers. Similarly, more impoundments will doubtless be built in the future, regardless of EPA's rules, for water supply and management needs. But EPA says they cannot be used for power plant cooling. Thus EPA intrudes, with little apparent thought, into the area of water resource development plans. Mr. Joe D. Carter, Chairman, Texas Water Rights Commission, testified at the hearings held by EPA on the proposed regulations:

In one fell swoop with these regulations, if adopted, EPA will completely disrupt our planning efforts and

will effectively stymie Texas programs designed to conserve and develop our precious water supplies. With such adverse effects on only one state, the damages to the nation as a whole are incalculable. (R. 18226)

In short, EPA's restrictions on the use of new cooling lakes impede sound water resource management in direct contravention to FWPCA. They will result in needless consumption of fresh water, rather than in its conservation, and will preclude, rather than promote, the "effective utilization" of the nation's water resources ordered by FWPCA 104(t). EPA's cooling-lake restrictions must be set aside.

(The above section i is from pages 85 and 90 of the appeal brief to the United States Court of Appeals for the Fourth Circuit in the case of Appalachian and Duke Power, et al. v. Russel Train, Administrator of EPA. Voluminous footnotes have been omitted.)

ii. Closed-cycle evaporative cooling systems reduce the efficiency and capacity of power plants in two ways. First a portion of the plant's energy output and capacity must be used to power them. (R. 35162-63) Second, especially in retrofit cases, their use results in higher cooling water temperatures, and thus, higher condenser pressures that make the turbine operate less efficiently, levying both fuel and capacity penalties. (R. 34879, 35162-63) These power requirements and penalties mean that about 2% more fuel must be burned and 3% more capacity must be built just to supply the same amount of electricity. (R35162-63)

b. Each of said fenerating units has a capacity of approximately 1280 MWe.

c. Each of said units can be designed to cool the exhaust steam from its turbine by different techniques.

d. One unit could be designed to be cooled by cooling towers, and two by once through cooling from an impoundment or by any permutation of cooling towers and once through cooling.

e. Duke Power has two unused electric generating sites on Lake Norman.

f. Lake Norman has a full pond elevation of 760 feet and at that elevation covers approximately 32,500 surface acres and has approximately 1,093,600 acre feet of water.

g. Lake Norman's drainage area is approximately 1,770 square miles.

h. Duke Power issued a brochure entitled "Lake Norman - Protecting the Inland Sea" in which it stated:

Even before Lake Norman was built, exhaustive environmental studies showed that a potential 10 million kilowatts of steam-generated electricity could be developed without harm to the lake's ecology. Marshal Steam Station, which was completed in 1970, and the new William B. McGuire Nuclear Station now under construction near the Cowans Ford Dam are two of four steam-electric stations that will eventually be located along the lake shore. Sites for the two additional plants have been set aside and they will be built as required to meet the growing demand for electric power.

i. That Marshall Steam Station (2025 MWe approximate capacity) and McGuire Nuclear Station

(approximately 2360 Mwe capacity) are located on Lake Norman.

j. If Duke Power studies (as in j above) establishing a 10,000 MWe cooling capacity are correct there is an excess of approximately 5,615 MWe existing and unused once through cooling capacity on Lake Norman.

k. If Lake Norman is available for once through cooling of all three of the Perkins units, it is an obviously superior site to the Yadkin River site.

l. If Lake Norman is available for once through cooling of only two of Perkins three units, it is obviously a superior site to the Yadkin River site.

m. If Lake Norman is available for once through cooling of only one of Perkins three units, it is an obviously superior site to the Yadkin River.

2. Intervenor requests that the applicant produce at the office of the undersigned attorney, for examination and copying, the following documents:

a. All of the environmental studies that showed that a potential of 10 million kilowatts of steam generated electricity could be developed by construction and use of a fossil or nuclear plant on or near Lake Norman without harm to the ecology of Lake Norman.

b. All of the studies done by the applicant or others for the applicant regarding the cooling capacity of Lake Norman for a power generation plant using once through cooling.

c. All correspondence from the applicant to the Environmental Protection Agency and from the Environmental Protection Agency to the applicant from 1970 until the present time regarding the use of Lake Norman for cooling purposes for an electric generating plant at sites other than the McGuire and Marshall plant sites.

d. All correspondence from the applicant to officials of the State of North Carolina or any agency thereof or from the State of North Carolina officials or any agency thereof and its officials to the applicant with regard to the use of Lake Norman for cooling towers or once through cooling for an electric generating site other than McGuire and Marshall plants.

e. All correspondence from applicant to Professor Huffs Schmidt or from Professor Huffs Schmidt to the applicant since 1970 in regard to the use of Lake Norman for cooling purposes by any of the present or future proposed generating plants and its effect on the environment of said lake or any other effects of said water usage.

f. All documents of whatsoever kind which the applicant now has in regard to the proposed cooling tower site designated in the site studies for February, 1973, as the Lake Norman, N-18 site and designated on one of the large maps, which is entitled "Location of Sites Figure 3.1" as the Lake Norman cooling tower site No. 1503 and designated on the other large map shown as Figure 10 as the Lake Norman site 150321 and in the summary report of January, 1978, as Lake Norman site 150312.

g. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Rocky River site numbered 140800.

h. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Lake Norman site "E" numbered 150510.

i. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Lake Norman site "D" numbered 150410.

j. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Tuckertown site numbered 140612.

k. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Badin Lake site numbered 140912.

l. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Dan River site numbered 110121.

m. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site

designated on the large map shown as Figure 10 as the Deep River site numbered 120121.

n. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Johns River site numbered 150200.

o. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Hunting Creek site numbered 140211.

p. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the Hunting Creek site numbered 140111.

q. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the South Yadkin site numbered 140310.

r. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the South Yadkin site numbered 140422.

s. All documents of whatsoever kind which the applicant now has in regard to the proposed plant site designated on the large map shown as Figure 10 as the South Yadkin site number 140512.

3. Intervenors submit the following interrogatories to be answered under oath:

a. Who controls and maintains all of the lakes and dams upstream from Lake Norman on the Catawba River?

b. Give the exact historical water flow records for the past ten years, or since the full development by dams and reservoirs north of Lake Norman on the Catawba River, of the said Catawba River below the Lookout Shoals Lake and dam and upstream from Lake Norman at approximately the proposed Lake Norman cooling site known as N-18. If the dams and reservoirs have been controlling the said river for more than ten years, please give this information for the full amount of time since said dam and reservoir control has been in full force by the applicant on the Catawba River upstream from Lake Norman.

c. Give the exact information on the projected effect on the water level at Lake Norman and the production of hydro-power at Lake Norman of the proposed cooling tower generating facility known as the Lake Norman site N-18.

d. State whether or not an additional holding pond or additional reservoir is required to be constructed in connection with the proposed cooling tower site on Lake Norman for a nuclear or fossil facility. If so, state what size and type of additional reservoirs would be required for the use of site N-18.

e. Give the exact information on the projected effect on the water level at Lake Norman and the production

of hydro-power at Lake Norman of the proposed generating facility shown as the Lake Norman site "E" 150510.

f. Give the exact information on the projected effect on the water level at Lake Norman and the production of hydro-power at Lake Norman of the proposed generating facility known as the Lake Norman site "D" 150410.

g. State the projected cost at this time of the construction of a three unit nuclear plant at the Lake Norman N-18 site and break down the expenditures in regard to each element of cost and compare this to the same costs for the construction of the same nuclear facility at the Perkins site on the Yadkin River.

h. State the projected cost at this time of the construction of a three unit nuclear plant at the Lake Norman "E" 150510 site and break down the expenditures in regard to each element of cost and compare this to the same costs for the construction of the same nuclear facility at the Perkins site on the Yadkin River.

i. State the projected cost at this time of the construction of a three unit nuclear plant at the Lake Norman "D" 150410 site and break down the expenditures in regard to each element of cost and compare this to the same costs for the construction of the same nuclear facility at the Perkins site on the Yadkin River.

j. State whether or not the above costs include the effect on downstream water uses, including power production and recreational uses. If so, state exactly what these projected costs are and how they were arrived at. If not,

state why these costs were not included.

k. State whether or not a combination once through cooling with tower cooling has been considered at the Lake Norman site N-18. If so, give all of the relevant information in regard to such a study. If not, state why a combination of methods was not considered. If a once through cooling plant was considered, give the relevant information in that regard.

l. State whether or not a combination once through cooling with tower cooling has been considered at the Lake Norman site "E" 150512. If so, give all of the relevant information in regard to such a study. If not, state why a combination of methods was not considered. If a once through cooling plant was considered, give the relevant information in that regard.

m. State whether or not a combination once through cooling with tower cooling has been considered at the Lake Norman site "D" 150410. If so, give all of the relevant information in regard to such a study. If not, state why a combination of methods was not considered. If a once through cooling plant was considered, give the relevant information in that regard.

o. State whether or not a person trained, certified, or educated specifically in hydrology has ever been consulted with in regard to either the Lake Norman site or the Perkins site or other Yadkin River sites over the past ten years. If so, state the name and address of said person

and attach any reports given by said person. If not, state why this was not done and point out whether other persons in other fields were used for such opinions and attach any opinions obtained from these persons. (This question refers to persons within the applicant's employment as well as persons outside of applicant's employment but contracted for or whose opinion was sought over the past ten years.)

p. Give in complete and specific detail all of the reasons, opinions, information, and any other matter which was discussed and utilized by the applicant between the years 1973 and the site study provided by the said applicant, which indicated a preference for the Lake Norman site and, decisions made in 1974 and 1975 to push for a site now known as the Perkins site on the Yadkin River for the construction of a three unit nuclear plant as the twin plant to a plant to be built at the Cherokee site in South Carolina.

q. State the present condition of Lake Norman with regard to eutrophication and state how this condition compares with the water at High Rock Lake at the present time.

r. State whether or not there is any rule curve or agreement of any kind in effect with regard to the lake level and water drawdowns at the Lake Norman reservoir. If so, please state what they are and attach a copy if any are in writing.

s. State the amount of water evaporated each year by a proposed three unit nuclear plant at the Lake Norman site N-18 in terms of its percentage to the total amount of

water in the said lake at its high water level and state how this annual percentage figure of the total volume of the lake compares to the annual figure for the proposed Perkins plant compared to the total volume of High Rock Lake.

t. State the amount of land bordering on Lake Norman which is now owned or controlled by the applicant or its subsidiary corporations and whether or not this land is being held or used for development in terms of sale or lease to persons for summer or permanent homes on said lake.

u. State whether the applicant owns any property on High Rock Lake and whether any of said property either owned or controlled by the applicant or its subsidiaries is involved in actual development in terms of leasing or selling said property to the benefit of the applicant.

v. State what departments and officials of the applicant's company are in charge of any land which the applicant owns or controls around Lake Norman and state what, if any, input these persons and departments have had in the decision or decisions made in 1973 and 1974 to propose cooling towers on the Yadkin River as opposed to the Catawba River or Lake Norman. If there are any written documents by these departments or persons, please attach all of such documents in regard to this question to your answer.

w. There is mention made of the red cockaded woodpecker as being an endangered species and that some of these are located in Iredell County. Please state what specific information applicant has that the construction of the proposed

nuclear plant at the N-18 site or the other Lake Norman sites would have any effect on said woodpecker.

x. Please state whether the above-named red cockaded woodpecker is present in any other counties in North Carolina, including Davie County which is next to Iredell County and which is the site of the proposed Perkins Plant.

y. Is it not a fact that the cooling tower site on the Catawba River at N-18 was the clearly superior site in 1973 to the Perkins site?

z. Is it not a fact that site N-18 is still a clearly superior site to the Perkins site in the light of all of the information, questions and objections which have been raised since the decision in 1974 to attempt to build a plant at the Perkins site rather than at the N-18 site?

aa. State in detail what, if any, meetings were held between the site studies of 1973 and the decision in 1974 to attempt to place a nuclear plant at the Perkins site.

bb. State whether any new or additional information was obtained between the site studies in 1973 and the decision in 1974 to proceed with efforts to build a nuclear plant at the Perkins site.

cc. State what objections, if any, were made by any persons either inside the applicant's company or outside of the company with regard to the N-18 site prior to the study of 1973 or after said study in 1973 and up until the present

time. If so, give the names of said persons or groups making any such objections.

dd. State whether construction plans which are now proposed for the Perkins site are basically usable and whether the same construction plans could be used for site N-18 or at the other nuclear sites on Lake Norman. If so, state how they could be used. If not, show what changes would be necessary and why such changes would be necessary.

ee. Since site N-18 was a cooling tower site for a plant similar to the proposed Perkins Plant, state why or whether it is the applicant's position that the effect on the aquatic life at Lake Norman is a significant issue as contended by the applicant that it is for the once through sites of which there are now two at Lake Norman.

ff. If the cooling towers at site N-18 have approximately the same effect on the waterlife of Lake Norman as the proposed Perkins plant does on the waterlife at High Rock Lake, and if the water in Lake Norman is at a much, much better level in terms of pollution and eutrophication than High Rock, and if the waterflow is more reliable and sufficient, and the lakes and dams upstream are controlled by the applicant, then is it not a fact that the site known as N-18 is clearly a superior site in terms of water quality and quantity than the Perkins site?

gg. Do any of the three of the site alternatives on Lake Norman have the possibility of a variation between

lake cooling and evaporation cooling which is not available at the Perkins site?

hh. Please state whether any of the applicant's officials and employees have stated orally or submitted any written document indicating that Perkins as a site may prove to be a questionable and inferior site on account of the effects on the downstream users and the need to build an additional pond such as the Carter Creek Reservoir which is not required at any of the Lake Norman alternatives.

ii. State whether or not officials from the Nuclear Regulatory Commission were taken to the upper Lake Norman site known as N-18 and whether this particular site was discussed in any detail with them.

jj. State whether any oral or written instructions on water releases were given to applicant's officials or employees at the Idols Dam prior to visits downstream of the Idles facility at the Perkins site in September of 1978 or several years before when the Perkins site was visited by other officials of the Nuclear Regulatory Commission.

kk. If any of such written or oral instructions were given about water releases at the Idols Dam, please indicate what these instructions were and whether or not there was an indication that additional water should be released in order that the flow downstream would appear more abundant than the case would have been without such instructions.

ll. State what officials or employees of the applicant have the authority to decide to abandon the location of the proposed nuclear facility at the Perkins site.

mm. State whether or not any of these persons have ever had a meeting since 1974 to discuss the question of whether or not the Perkins site should be abandoned. If so, state the substance of the discussion and the result of such discussion. If not, state why no discussion has ever been held and state whether or not such discussions are in fact ever held about any other project.

nn. State whether or not the applicant has made a decision not to decide about whether to abandon the Perkins site but to simply leave the matter in the hands of third persons or other bodies for such a decision to be made.

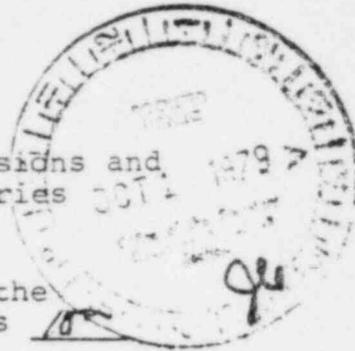
This the _____ day of October, 1978.


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CERTIFICATE OF SERVICE



I hereby certify that copies of a Request for Admissions and Request for Production of Documents and Interrogatories

in the above-captioned matter have been served on the following by deposit in the United States mail this day of October, 1978.

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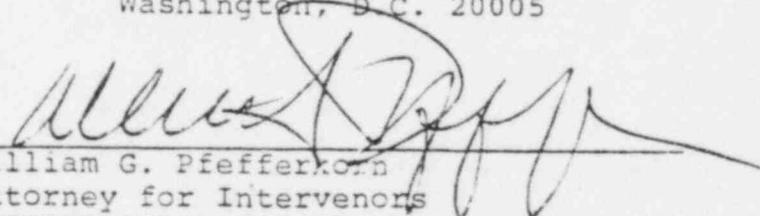
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