

ARKANSAS
PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE JOINT APPLICATION)
OF SOUTHWESTERN ELECTRIC POWER COMPANY)
AND ARKANSAS ELECTRIC COOPERATIVE CORP-)
ORATION FOR A CERTIFICATE OF ENVIRON-) DOCKET NO. U-2532
MENTAL COMPATIBILITY AND PUBLIC NEED) # 10
FOR THE CONSTRUCTION, OWNERSHIP, OPERA-)
TION AND MAINTENANCE OF "MAJOR UTILITY)
FACILITIES")

IN THE MATTER OF THE APPLICATION OF)
SOUTHWESTERN ELECTRIC POWER COMPANY FOR)
A CERTIFICATE OF ENVIRONMENTAL COMPAT-) DOCKET NO. U-2533
IBILITY AND PUBLIC NEED FOR THE CON-)
STRUCTION, OWNERSHIP, OPERATION AND)
MAINTENANCE OF CERTAIN TRANSMISSION)
LINES ("MAJOR UTILITY FACILITIES"))

O R D E R

On April 9, 1974, Southwestern Electric Power Company (SWEPCO) and Arkansas Electric Cooperative Corporation (AECC) filed an application with the Commission seeking a Certificate of Environmental Compatibility and Public Need for the construction, ownership and maintenance of "major utility facilities" located on Little Flint Creek in Benton County, Arkansas. Additionally, on April 9, 1974, SWEPCO filed an application with the Commission seeking a Certificate of Environmental Compatibility and Public Need for the construction, ownership, operation and maintenance of certain transmission lines which would be constructed to facilitate distribution from the plant proposed at Little Flint Creek in Benton County, Arkansas. The above styled dockets have been consolidated for hearing.

Pursuant to Commission order, a public hearing was commenced on September 16, 1974, and concluded on September 19, 1974. In addition to the Applicants and the Commission Staff, the other parties participating as Intervenors were: Arkansas Department of Health, Arkansas Department of Planning, Arkansas Department of Pollution Control and Ecology, the Arkansas Ecology Center and the Energy Council of Northwest Arkansas.

Jurisdiction over the subject matter before the Commission is had by virtue of Act 164 of 1973, otherwise known as the "Utility Facility Environmental Protection Act."

Pursuant to Act 164, SWEPCO and AECC filed as part of their Application a document entitled "Flint Creek Power Plant Environmental Report." The Staff subsequently issued a Deficiency Letter declaring that the Applicants had failed to include certain relevant environmental aspects of the proposed facility and inadequately developed others. On July 17, 1974, Applicants filed a response to the Deficiency Letter.

Section 9 of Act 164 charges the Commission to make certain specific findings and determinations as follows:

- A. The basis of the need for the facility.
- B. That the facility will serve the public interest, convenience and necessity.
- C. The nature of the probable environmental impact.

- D. That the facility represents an acceptable adverse environmental impact, considering the state of available technology, the requirements of the customers of the applicant for utility service, the nature and economics of the proposal and the various alternatives, if any, and other pertinent considerations.
- E. In the case of an electric transmission line, that such facility is not inconsistent with known plans of other electric systems serving the State which have been filed with the Commission.
- F. That the location of the facility as proposed conforms as closely as practicable to applicable State, regional and local laws and regulations issued thereunder.

The Commission is further instructed in Section 9 of Act 164 of 1973 to grant or deny the application as filed, or grant it upon such terms, conditions or modifications of the construction, operation or maintenance of the facility as the Commission may deem appropriate. (Emphasis added)

Having set forth the legal requirements imposed upon it by statute, the Commission, therefore, proceeds to a discussion of the proposed project and an enumeration of its findings and conclusions with regard thereto.

I. THE PROPOSAL

GENERAL DESCRIPTION OF THE LOCATION AND TYPE OF "MAJOR UTILITY FACILITIES" TO BE BUILT.

(a) Site Location

The proposed site for Flint Creek Power Plant Unit No. 1 is located on Little Flint Creek in Benton County, Arkansas, approximately 2 miles west of the City of Gentry in the extreme northwest corner of the State. The approximate location of the plant facilities is at 36° 15' 45" latitude and 94° 31' 15" longitude. The actual plant site is located within Sections 5 and 8, Township 18 North, Range 33 West of the Fifth Principal Meridian, and, in addition, lands in Sections 6, 7 and 18 in Township 18 North, Range 33 West, and in Section 13, Township 18 North, Range 34 West, will be acquired. The site and surrounding areas are primarily rural. The Kansas City Southern Railroad, the closest rail carrier, runs in a generally north-south direction and is located at its nearest point approximately 2 miles east of the proposed power plant. The nearest major highways are Arkansas 59 and 12, both of which pass through the City of Gentry. A total of approximately 1,200 acres will be required for the Flint Creek plant, of which nearly 531 acres will be inundated with a cooling lake to be formed by the construction of a dam in the north half (N-1/2) of the southwest quarter (SW-1/4) of Section 18, Township 18 North, Range 33 West; 125 acres will be utilized for the plant facilities, which will be located approximately 1-1/2 miles northeast of the dam site.

(b) General Description of the Type of "Major Utility Facilities" to be Built

Turbine Generating Unit, Boiler and Related Facilities

The Flint Creek Power Plant Unit No. 1 will have a net capability of 528,000 KVA, and will operate at 3,600 r.p.m., 18,000 volts, 3-phase, 60 cycles. It will be cooled with hydrogen at 60 lbs. per square inch guage pressure (psig).

The plant will have a 3,973,000 lb/hr steam generating unit which will operate at 2,520 lbs. psig with 1,000° F. steam at the high-pressure turbine inlet. In the high-pressure turbine, the steam will be expanded to approximately 609 lbs. psig at 634° F. and then will be returned to the intermediate-pressure turbine after reheat to the 1,000° F. temperature level.

The steam will then be expanded again to 165 lbs. psig and 700° F. and then passed to a low-pressure turbine. The low-pressure turbine will continue to expand the steam to about 2.5 inches of mercury absolute pressure, exhausting it to a shell and tubular condenser. The condenser will extract the latent heat of condensation and return cool, high-purity water to the steam generation cycle. All three turbines will be mounted on a single shaft, which will drive the electric generator. This is termed a "tandem-compound" arrangement.

Two forced draft fans will supply combustion air to the furnace, while two induced draft fans will transfer the products of combustion to the boiler stack. The forced draft fans will be provided with inlet silencers and the induced draft fans will be accoustically insulated for noise suppression.

The boiler will be equipped with over-fire air ports to lower flame temperature and thereby reduce the formation of NO_x. Two regenerative-type air heaters will exchange heat between the hot combustion gases leaving the boiler and the incoming cool air supply going to the combustion chamber of the boiler.

Two electrostatic precipitators will be used to remove the suspended fly ash particulate in the combustion gases. These precipitators are designed to remove 99.6% of the particulate (fly ash) in the combustion gases going up the stack.

Other major equipment will be a tubular-type surface condenser, feedwater pumping equipment, a regenerative feed-water heating system, a water treating system for providing plant make-up, coal and ash handling and storage systems, and a cooling lake for heat dissipation.

Dam and Cooling Lake

Cooling for Flint Creek Power Plant Unit No. 1 will be accomplished by circulating cooling water taken from a man-made cooling lake formed by a dam on Little Flint Creek built in the N-1/2 of the SE-1/4 of Section 18, Township 18 North, Range 33 West, approximately one mile downstream of the confluence with its tributary about four and one-half miles north of the City of Siloam Springs. The dam will have length of approximately 1,700 feet, a height of about 100 feet, and a 3 to 1 (horizontal to vertical) slope on the upstream face and 2.5 to 1 on the downstream face. The upstream slope will be rip-rapped for protection against wind wave erosion. The top of the dam will be at an elevation of 1,153 feet (MSL).

The cooling lake will have a capacity of approximately 16,800 acre-ft and an area of 531 acres at a normal operating level of 1,140 feet (MSL).

Fuel

Flint Creek Power Plant Unit No. 1 will be designed to burn Wyoming low-sulfur coal, which is expected to have an average total sulfur content of not more than 0.48%. SWEPCO has already negotiated and consummated a long-term contract with American Metal Climax, Inc., AMAX Coal Company Division, which purportedly guarantees an adequate supply of low-sulfur coal to be mined at and shipped by rail from the vicinity of Gillette, Wyoming, for said unit. SWEPCO has further negotiated a long-term contract with the Kansas City Southern Railroad Company and connection carrier or carriers for the shipment and carriage of said coal from Wyoming to the plant site. The coal will be burned in pulverized form, and light fuel oil will be utilized for boiler ignition and warm-up purposes.

II. FINDINGS

(a) The Basis of Need for the Facilities

The need for additional generating capacity to serve the residents of Northwest Arkansas was virtually unquestioned at the hearings.

Mr. Larry Hoaglan of the Commission Staff testified that by the year 1978 there will be a need for 513 additional megawatts to be generated or transmitted into the system in Northwest Arkansas.

The Commission finds that the need will exist by 1978 for additional electrical energy in Northwest Arkansas and that an environmentally compatible generating station is one alternative solution to that need.

(b) That the Facility will Serve the Public Interest, Convenience and Necessity

The Commission, having found that a need exists for the construction of at least 513 additional megawatts of generating capacity in the Northwest Arkansas area, it follows that the construction of such a facility together with the needed transmission lines will serve the public interest, convenience and necessity. However, the Commission must also determine whether the proposed use of coal as a fuel for such facility is also consistent with the public interest, convenience and necessity.

The evidence reflects that the Applicants have examined the use of natural gas and fuel oil as alternative boiler fuels for the proposed plant and have determined that coal is the most feasible of the three alternatives. The Commission must agree.

The Commission finds that shortages and increases in prices of petroleum products and natural gas have made it necessary for some electric utility systems to convert to coal-fired generating facilities.

The evidence further reflects that the coal contracted for by the Applicants is of sufficient quantity and low enough in sulfur content to make it a desirable boiler fuel.

This is not to say that all future generating plants constructed in Arkansas must or ever should use coal as a fuel. The Commission is hopeful that the technology of new and more desirable energy sources will be forthcoming.

(c) The Nature of the Probable Environmental Impact

With respect to the proposed facility's direct and indirect effects on the ecology of the air environment, it appears from the record that the Flint Creek Plant can be operated within the requirements of State and Federal air pollution control laws and regulations relating to particulate emissions, nitrogen oxides (NO_x), and visible emissions.

The Applicants propose to meet the State and Federal sulfur dioxide emissions regulations by the use of low sulfur coal having an average heat content of 8,250 BTU/lb. and an average sulfur content of .35% by weight with a .7% maximum. These values were contained in the Environmental Impact Statement filed by the Applicants and in their response to the Commission's Deficiency Letter, and all computer modeling studies of sulfur emissions used these values. During the course of oral testimony, however, John W. Turk, Jr., Vice-President and Superintendent of Power of SWEPCO, stated that a more realistic sulfur content value was .5% rather than .35% as originally stated. Assuming no sulfur retention in the ash, coal having an average sulfur content of .48% or greater would cause a violation of the New Source Performance Standards of the Environmental Protection Agency (EPA), which permits a maximum emission of 1.2 lbs. SO₂ per million BTU. While some sulfur will no doubt be retained in the ash, the potential for violating the New Source Performance Standards exists and Applicants should be required to implement a program of sampling and mixing the coal as necessary to assure a sulfur content of less than .48% before combustion.

The Applicants have failed to sustain their burden of proof that the proposed stack height of 241 feet is adequate to assure compliance with the sulfur dioxide limitation contained in Section 8 of the Arkansas Air Pollution Control Code, as amended which permits a maximum SO₂ ground level concentration of 0.2 parts per million (533 ug/M³) for a 30-minute average. The original design of the plant prepared by Applicants' engineers called for a 500 foot stack. Because computer simulation modeling seemed to demonstrate compliance with applicable sulfur dioxide standards with a margin of safety, SWEPCO directed the engineers to consider reducing the stack height, from which came the 241 foot proposed stack. The evidence is persuasive that Applicants' modeling studies are unreliable because they do not take into account downwash effects which are reasonably to be anticipated from the proposed short stack.

The proposed stack height of 241 feet is only 25 feet above the roof line of the boiler. EPA recommends stack heights 2.5 times the height of the nearest structure and this rule has been historically accepted as reflecting good engineering practice. Such relationship minimizes the effect of building turbulence causing downwash of the plume, which, in turn, brings the plume to the ground near the stack in unpredictable, but sometimes high, concentrations. Applicants attempted to show that the 2.5 rule for stack height did not apply to emissions from the proposed plant because the boiler with the supporting structure was an "open structure" and the plume from the boiler was a buoyant plume. While the boiler structure may be considered open, the boiler itself presents a formidable obstruction to air flow. As far as the buoyant plume is concerned, there is no reason to believe the plume from the proposed facility would be any more buoyant than plumes from Tennessee Valley Authority (TVA) facilities, which employ high stacks. Also, no wind tunnel studies were conducted by Applicants on the proposed short stack to determine downwash.

Extensive computer modeling studies conducted by the Department of Pollution Control and Ecology reflect that the 241 foot stack configuration subjects the facility to the potential

for violations of Section 8 of the Air Code during "worst case" meteorological conditions. A satisfactory solution would be to install a taller stack of from 565 to 600 feet which can reasonably be expected to eliminate downwash effects and avoid violations during worst case conditions. Not only would a taller stack tend to assure compliance during adverse meteorological conditions, it would also offer substantial improvements in air quality during normal meteorological conditions.

The record reflects that the current status of the technology for removing sulfur dioxides from the flue gas of coal-fired power plants does not offer effective and reliable control devices. Furthermore, the installation of sulfur removing devices, such as limestone scrubbers, are excessively expensive both to install and to operate. Moreover, the use of scrubbers is attended with the serious environmental problem of the disposal of the resulting sulfur sludge. A requirement that sulfur oxide scrubbers be installed on the Flint Creek unit is not indicated by the record in this hearing. The Applicants have testified that the plant is designed so that scrubbers may be retrofitted if indicated by future developments in the state of the art or if later mandated by law.

Turning to the proposed facility's direct and indirect effects on the ecology of the water environment, a number of important issues with respect to which the Applicants have the burden of proof remain unanswered. A 531 acre lake is proposed to be constructed by impounding Little Flint Creek. This lake will average 31 feet in depth and will serve as a cooling pond for the electric generating plant. Little Flint Creek is presently possessed of clear water, virtually pollution-free, and is useful for recreational and esthetic purposes as well as fish and wildlife propagation, stock watering and possibly irrigation. There is presently perennial flow in the creek in the area of the proposed dam site and downstream therefrom.

Testimony of the Applicants concerning water quality reasonably to be anticipated in the lake, at the spillway discharge, and downstream, is incomplete and inadequate. No attempt has been made by Applicants to assess the effects on downstream ecology, or to provide assurances that a minimum flow will be maintained to protect fish and aquatic life downstream. No biological sampling was conducted by Applicants downstream.

As of the date of the hearing in this case, the Applicants had applied to the Soil and Water Resources Commission for a permit to construct the dam on Little Flint Creek, as required by Section 21-1306, Ark. Stats. Ann. It cannot be assumed that this permit will be granted or, if granted, what minimum downstream release of water will be required. The statute provides, among other things, ". . . that there shall be discharged each day from the water impounded by it (the dam) a quantity of water as may be fixed by the Commission (Soil and Water Resources) as that necessary to preserve, from time to time, below the dam, the flow of the stream involved at a rate designed to protect the rights of lower riparian owners, and the fish and wildlife dependent thereon . . .".

The water quality as projected by Applicants in the cooling lake indicates that the temperature, turbidity and, possibly dissolved oxygen standards will not be met at and below the spillway. Applicants sought to support their position by broad references to experience at "similar projects" and without supporting documentation or calculations. The SWEPCO Memorandum Brief on page 30 contains typical examples of such broad generalizations from the witness Turk. The brief states: "The witness (Turk) stated further that the lake has been designed so it will not exceed temperature limitations at the point of water discharge downstream of the dam (Tr. 272), and the only time the lake discharges downstream is

during the rainy season, when the temperatures are necessarily low (Tr. 273). The witness stated that the plant could be operated so that the maximum temperature at the point of discharge would not exceed 90 degrees; that he would be "comfortable" with 90 degrees; that there had never been a water discharge at the Wilkes plant (a similar plant operated by SWEPCO in East Texas) at a higher temperature than 90 degrees (Tr. 275)." These unsupported predictions and conclusions do not, of course, constitute evidence. Furthermore, the statement of Mr. Turk that there had never been a water discharge at the Wilkes plant higher than 90 degrees did not survive a request on cross-examination that the actual data be checked by SWEPCO. It was then revealed that Mr. Turk was wrong; that discharges from the Wilkes cooling lake, which SWEPCO cited as comparable to the proposed Little Flint Lake, showed discharges running as high as 97 degrees, far in excess of the maximum of 90 degrees established by Regulation No. 2 of the Arkansas Department of Pollution Control and Ecology, as amended.

It is uncontroverted that the plant operation will cause the water in the lake itself to be violative of the water quality standards contained in Regulation No. 2, as amended. This is true not only in respect to temperature, but to dissolved solids, turbidity, and dissolved oxygen as well. Regulation No. 2 is applicable to all surface waters, interstate and intrastate, of the State of Arkansas. Section 2(9)(a) of the Arkansas Water and Air Pollution Control Act (Sec. 82-1902 (9)(a) defines "waters of the State" as meaning "all streams, lakes, marshes, ponds, water courses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon this State or any portion thereof." Applicants contend that the 531 acre lake made by impounding Little Flint Creek, a public stream, must be considered to be part of their private waste disposal system and that the standards established by Regulation No. 2 are not applicable to the lake itself, but only to the water at the discharge point. Applicants further argue that the statute is unconstitutional, if applied to the lake. It is not necessary that this Commission address these arguments for the reason, among others, that the Applicants have not applied to the Commission on Pollution Control and Ecology for an exemption or variance from the water quality standards established by Regulation No. 2 as applied to the cooling lake, and, therefore, have not exhausted their administrative remedies.

Therefore, the Commission finds that any order granting a certificate allowing Applicants to proceed with construction of the proposed facilities should be made contingent upon Applicants successfully obtaining the proper air and water certificates from the Arkansas Department of Pollution Control and Ecology and the Arkansas Soil and Water Conservation Commission.

(d) That the Facility Represents an Acceptable Environmental Impact Considering the State of Available Technology

As discussed above, the Commission has found that the state of technology as to stack gas emission controls, popularly known as "scrubbers", is not such that makes them feasible in view of their excessive cost and uncertain effectiveness.

However, the Commission realizes that there is considerable research currently being conducted in this field of technology and that sulfur scrubbing may become feasible and desirable at some time in the future. Furthermore, as there exists the possibility that Federal regulatory agencies may require the installation of scrubbers in the future, the Commission concludes that the

Flint Creek plant must be designed to allow for the future installation of scrubbers should this Commission or some other appropriate authority order their installation.

- (e) That Such Facility is Not Inconsistent with Known Plans of Other Electric Systems Serving the State Which have been Filed with the Commission

The Commission takes administrative notice that no other electric system serving Arkansas has filed any application inconsistent with the location of the plant herein considered or the proposed transmission facilities.

- (f) That the Location of the Facility as Proposed Conforms to State, Regional and Local Law

As noted hereinabove, the proposed facility is subject to approval as to air and water certification by the Arkansas Department of Pollution Control and Ecology and to dam construction certification by the Arkansas Soil and Water Conservation Commission.

CONCLUSIONS

Based upon the above findings, the Commission reaches the following conclusions with regard to the proposed project:

1. The Commission has jurisdiction of the subject matter and the parties in this proceeding by virtue of the Utility Facility Environmental Protection Act (Act 164 of 1973).

2. There will be a need for 513 megawatts of additional generating capacity to meet Applicants' customers needs by 1978.

3. Coal is a feasible alternative to natural gas or fuel oil as a boiler fuel for electric generating plants due to its relative availability and comparative low price.

4. The Applicant has not shown that the proposed plant with the presently contemplated 241 foot stack can meet the requirements of the Arkansas Air Code.

5. The evidence does reflect that the proposed plant would represent an acceptable adverse environmental impact, insofar as air quality is concerned, if the following modifications in the proposed design and operation of the plant are made: (1) the stack be increased to a height between 565 and 600 feet, (2) development and implementation of a program of sampling and mixing the coal used in the plant as necessary to assure a sulfur content of .48% before combustion, (3) the plant be designed for retrofitting of sulfur oxide scrubbers should future developments in the state of the art indicate the desirability of this installation, and (4) that the Applicants design, install and operate an Intermittent Control System adequate to ensure compliance with Section 8 of the Arkansas Air Pollution Control Code. However, with regard to the probable environmental impact upon water quality, the competent evidence of record is not sufficient to establish that the plant operation as proposed will not violate Regulation 2 of the Arkansas Department of Pollution Control and Ecology with regard to the standards for temperature, dissolved solids, turbidity and dissolved oxygen applicable to the water in the cooling lake or at or below the spillway for the cooling lake. The Commission, therefore, finds that the certificate for construction of the Flint Creek plant should be granted subject to the following conditions and modifications:

- (a) The stack height must be increased to between 565 and 600 feet,
- (b) The Applicants must develop and implement a program of sampling and mixing the coal used in the plant as necessary to assure a sulfur content of .48% before combustion,
- (c) The plant must be designed for retrofitting of sulfur oxide scrubbers should future developments in the state of the art indicate the desirability of their installation,
- (d) The Applicants must design, install and operate an Intermittent Control System adequate to ensure compliance with Section 8 of the Arkansas Air Pollution Control Code, and
- (e) That a further hearing in this proceeding be set for January 30, 1975, at 9:30 a.m., at which time the Applicants must present competent evidence to reflect that the operation of the plant will not violate Regulation No. 2 of the Arkansas Department of Pollution Control and Ecology with regard to the standards for temperature, dissolved solids, turbidity and dissolved oxygen applicable to the water in the proposed cooling lake or at or below the spillway for the cooling lake.

The issuance of a Certificate of Environmental Compatibility is further conditioned upon the issuance by the Arkansas Department of Pollution Control and Ecology of air, water and solid waste disposal permits for said facility; and upon the issuance by the Arkansas Soil and Water Conservation Commission of a certificate to construct the dam proposed to form the cooling lake adjacent to the plant herein proposed.


IT IS SO ORDERED

This 9th day of January, 1975.

Pat Moran, Chairman

Robert C. Downie, Commissioner

Jerry D. Jackson, Commissioner


Tommie Castillow
Tommie Castillow
Executive Secretary