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STATUS REPORT ON THE CALLAWAY NUCLEAR POWER PLANT

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Abstract

The progress to date of the first nuclear-powered, electric generating plant proposed to be constructed in the state of Missouri is described.

1. INTRODUCTION

The Callaway Plant will be the first nuclear-powered, electric generating plant in the state of Missouri. It is being built by Union Electric Company which provides electrical power to St. Louis and the northeastern portion of the state.

This paper will describe the progress on the project to date with regard to the site selection, the plant design, the licensing process, expected environmental effects, and construction schedule.

2. SITE SELECTION

In July of 1973 Union Electric announced the selection of a site in central Missouri for the proposed nuclear plant. The site is located in Callaway County, 10 miles southeast of Fulton, 25 miles northeast of Jefferson City and 100 miles west of St. Louis. The site consists of about 6,600 acres, and is 4-1/2 miles north of the Missouri River. The site is on a plateau well above the flood plain (about

300 feet higher than the mean river level).

The selection of the site was made following an extensive 18-month study conducted by Union Electric and Dames & Moore, a consulting firm which specializes in environmental and applied earth sciences. More than 70 sites in four states (Missouri, Iowa, Illinois and Arkansas) were investigated before the Callaway site was selected. The site is outside areas subject to high seismic activity. Numerous base-line studies have been conducted at the site in order to confirm its suitability for a nuclear power plant and to determine the environmental effects of construction and operation.

3. PLANT DESIGN

The plant will consist of two units each of 1.15 million kilowatt electrical generating capacity. The two nuclear steam supply systems (reactors) will be manufactured by Westinghouse and the turbine-generators by General Electric.

Five utilities (Union Electric, Northern States Power Company, Rochester Gas & Electric Company, Kansas City Power & Light Company, and Kansas Gas & Electric Company) have formed an organization called SNUPPS (for Standardized Nuclear Unit Power Plant System) to build five identical nuclear generating units, including the two for Union Electric. The other three units will be built in Kansas, Wisconsin and New York.

Bechtel Power Corporation, of Gaithersburg, Maryland, is the architect-engineering firm responsible for developing the design of the standardized plants for SNUPPS. Sverdrup & Parcel and Associates, of St. Louis, is the architectural-engineering consultant for the development of the Callaway site for Union Electric. Daniel International Corporation, of Greenville, South Carolina, has been selected as contractor for construction of the Callaway Plant.

The Callaway Plant is projected to cost about \$1.75 billion. As was indicated in the testimony presented to the Missouri Public Service Commission, the two-unit plant has been projected to cost \$765/kW compared with \$685/kW for equivalent coal plant capacity. Although the capital costs of building a nuclear plant are greater than for a coal plant, when the other costs such as for fuel, operation and maintenance, and annual investment charges are taken into account the electricity generated by the nuclear plant will be about 30 per cent less than that from a coal plant. This corresponds to approximately \$145 million annual savings to the customers. (The cost figures are in 1982 dollars.)

The standardization of the plant design and multiple unit equipment purchase is expected to result in savings of both time and money. Included in the standardized

design is the concept of "slide-along", duplicate units for multi-unit plants such as Callaway. There are no shared operating systems or facilities from one unit to the next, except for the switchyard and ultimate heat sink. Another design feature is that the turbine building is of a penisular arrangement, thus the likelihood of a turbine generated missile being of consequence to the reactor is less than for a tangential arrangement.

An access corridor from the Missouri River to the site will contain an intake pipeline to supply the plant's water requirements. The plant will utilize two hyperbolic, natural draft cooling towers for waste heat disposal, thereby minimizing the effect of returning heated water to the river.

There are about 56 nuclear power plants licensed to operate in the U.S. These present plants have the capacity to produce 8 per cent of the nation's electricity. An additional 63 units are under construction, and 103, including Union Electric's two units, have been announced or are on order. (These figures are the official figures as of June 1, 1975.)

4. LICENSING PROCESS

The Union Electric nuclear facility will meet all applicable design, operational, safety and environmental requirements as directed by the U.S. Nuclear Regulatory Commission (formerly the U.S. Atomic Energy Commission) and other regulatory bodies.

The licensing of a nuclear power plant is a complex process and this has been the major effort by Union Electric to date. During the same time Bechtel Power has been involved with the overall plant design. Before an electric utility can build a nuclear power plant it must obtain

the approval of the U.S. Nuclear Regulatory Commission. The licensing process is a two-stage procedure. The first stage consists of the filing and processing of an application for a construction permit. The second stage consists of the filing and processing of an application for an operating license at the time the plant is nearly complete. The main documents which are used to support the application for a construction permit are the Preliminary Safety Analysis Report (PSAR) and the Environmental Report (ER). These two documents for the Callaway Plant were filed in April and May of 1974, respectively. Following the so-called "mini-review" for completeness of the documents, the NRC formally docketed the application on June 21, 1974.

Numerous other approvals are required by various regulatory agencies; however, the NRC has the primary responsibility for assessing the environmental and safety effects of the proposed plant. For instance, application was made to the Missouri Public Service Commission in June of 1974 for a certificate of convenience and necessity. Public hearings were held before the MPSC in the fall of 1974 and their approval was granted in March.

The regulatory staff of the NRC conducted their review of the Environmental Report from May 1974 to October of that year when they issued their Draft Environmental Statement to the other concerned agencies for comment.

The Final Environmental Statement which incorporated the comments of other agencies was prepared by the NRC and published March 1975. A summary of the expected environmental effects of plant construction and operation is given in that report. After weighing the environmental, economic,

and technical benefits of the Callaway Plant against environmental and social costs resulting from the facility, and considering the available alternatives, the Nuclear Regulatory Commission concluded that a construction permit should be granted for the Callaway Plant. Special actions would have to be taken to avoid unnecessary adverse environmental impacts due to construction, and monitoring programs would be conducted to assure that negative environmental impacts are minimized during construction and operation.

Public hearings were then conducted in April of 1975 by a three-member Atomic Safety and Licensing Board (ASLB) on the environmental effects and other site-related matters. Also in April a Limited Work Authorization was requested by Union Electric. Eleven days of public hearings were held between April 8 and July 2. On August 8 the ASLB recommended that the NRC grant the request for Limited Work authorization and on August 14 the NRC gave official notice that they would grant the request for Limited Work Authorization. The activities which could be done under the LWA include site preparation consisting of relocation of an existing transmission line, removal of houses and other buildings, clearing, grubbing and grading of the construction area, and excavation for the foundations. Also allowed are the construction of support facilities, consisting of a limestone processing facility and mine and the drilling of a well for construction water. Certain roads will be relocated and the railroad spur subgrade prepared, as well as the necessary construction buildings will be erected.

An independent review of the safety aspects has been conducted by the Advisory Committee on Reactor Safeguards (ACRS) and their approval for the project was given September 17.

Another round of public hearings will be conducted this fall in about November by the ASLB regarding the radiological safety of the proposed plant design. These hearings must be completed and the ASLB must give its final approval before actual plant construction can begin.

5. CONSTRUCTION SCHEDULE

Activity under the Limited Work Authorization began near the first of September 1975 and issuance of the Construction Permit is anticipated in March or April of 1976 at which time major construction will begin. The construction work force is projected to peak at 3000 in 1980. The operating staff for the plant will be approximately 150 people.

In approximately 1980 an application will be submitted for an Operating License.

Unit one is planned to be in operation in October of 1981 and unit two in April of 1983.

6. BIOGRAPHIES

Dr. A. E. Bolon is an Associate Professor of Nuclear Engineering and Metallurgical Engineering at the University of Missouri-Rolla. He also is a consultant to Union Electric Company. He has worked with the company the past four summers and the 1972-73 academic year while on sabbatical leave.

Dr. Bolon received his Ph.D. in nuclear engineering from Iowa State University and his B.S. and M.S. from Missouri School of Mines and Metallurgy.

Mr. D. F. Schnell is Manager, Nuclear Engineering at Union Electric Company. He is responsible for plant site studies, equipment procurement, coordination of design with the architect-engineer and licensing of the Callaway Plant.

Mr. Schnell has been with Union Electric

Company for 19 years. He received both his B.S. and M.S. degrees in Mechanical Engineering from Washington University.