ARKANSAS NUCLEAR ONE

By STEVEN CAIN

Now that the energy crisis has come to a head with the coal, natural gas, and fuel oil rapidly dwindling, nuclear power seems to be one of the better ways to supply energy. Arkansas Nuclear One will be the Southwest's first nuclear powered electric generating station.

Built, owned, and operated by Arkansas Power and Light, Nuclear One is scheduled for operation and the selling of electrical power in early 1974.

Located approximately five miles to the west of Russellville, Arkansas, Nuclear One will use the Dardanelle Reservoir as its water intake system.

A nuclear power plant is similar to any other steam electric generating plant, for each must use fuel to make steam. The heat brings the water to a boil and the boiling water turns into steam. The steam then drives the turbines which turn the generator to produce electricity. The source of heat is the only major difference.

In the nuclear plant, uranium rods are placed in the reactor and bombarded by neutrons. This bombardment causes a splitting of the uranium atoms and thus by this process called fission, heat is produced. Pressurized water around the rods is heated, then passed into the steam generator where the water is converted to steam. The steam powers the turbines which in turn causes the generator to produce electricity. The steam is then cooled and condences back into water and then is pumped back into the steam generator to be used again.

There are two units at the nuclear plant. Unit One is to be an open system as compared to Unit Two which is to be a closed system. The open system will take water from the reservoir, use it, and return it back to the lake. The closed system will take in the water but will reuse it over and over again.

By the time the water flows to the center of the lake in the open system, it must have no more than a 2° F difference in the temperature between the intake and the output. The temperature of the output is 15° higher than the input immediately leaving the plant, but by the time the water flows the 2 miles of access stream to the lake, the water is approximately the temperature of the input.

The input water system has numerous screens of decreasing size to keep logs and other floating debris out of the reactor. Should any material pass through the screens, the material will be ground to a fine powder and fed back into the output.

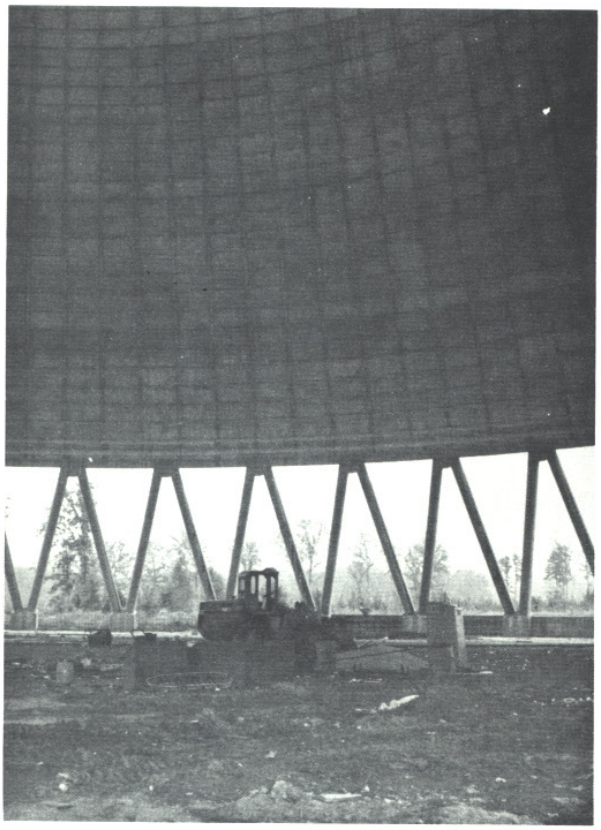
Most of the fish in the lake will be kept out by the screens. The small fish that make it through the screens will be turned back by a wall of bubbles.

The intake of the water for Unit One will be approximately 750,000 gallons per minute. If the water was not returned back to the lake, the plant would drain the Arkansas River dry in 3 hours.

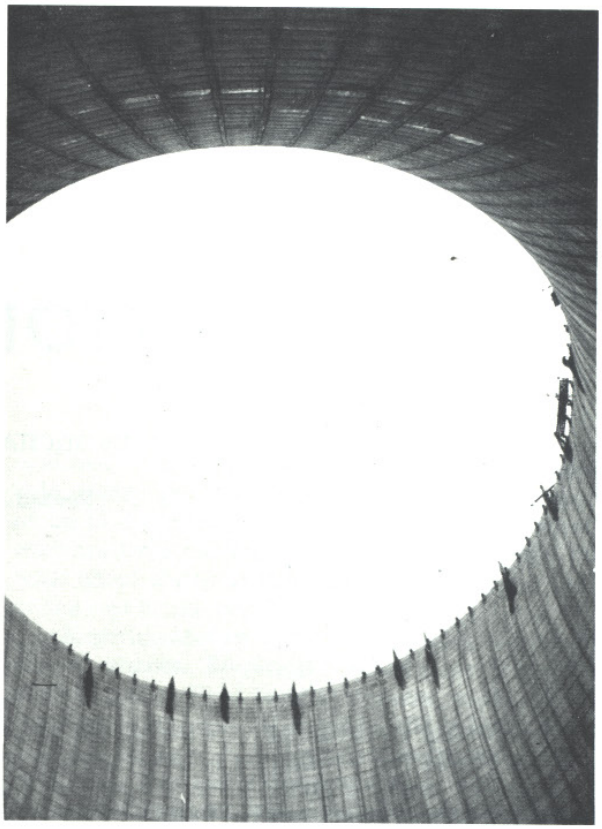
The Unit Two will be a closed system. The water will be taken from the lake but will not be put back after use. Although the temperature of water at the output would have been within the set temperature limits, it would have been running close to the limits. Therefore a natural draft cooling tower was constructed.

This tower is made of concrete and its cost for construction was over 8 million dollars. The hyperbolic shaped tower is 450 feet high with a 258 feet diameter at the top and a diameter of 330 feet at the bottom. The bottom of the tower is approximately 60 feet above the surface of the ground. The water from the reactor will be placed in a pool 9 feet deep which is directly below the tower. The tower will have hot water circulating in pipes in the upper portion of the tower where the diameter is the smallest. This will cause a vacuum affect and the heat of the water will rise to the top of the tower and be discharged into the atmosphere. The water will be returned to the reactor as soon as the temperature is low enough to be useful.

Anyone working near the reactor must wear



The Cooling Tower Support System.



The Cooling Tower from the inside looking up.

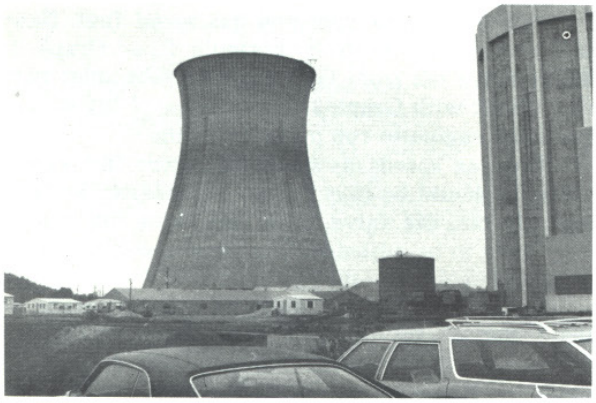
special clothing similar to hospital gowns. The clothes will be washed and the water will be stored underground in tanks permanently. The workers themselves must shower and wash any tools that may have been in the area. This water will join the clothes water in the permanent storage tanks.

The operators of the reactor must have control of an area with a radius of 6.5 miles from the center of the reactor. They will monitor 52 doors and gates from the main control center by the use of computors.

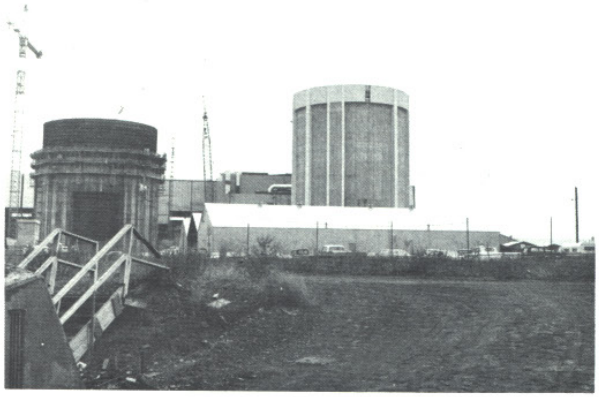
Mr. Ralph Nader visited the plant and after a complete tour said that there was no problem with the plant or with its controls for safety. There are many back up systems needed to insure the safety of the plant. Should one system fail, another system will go into operation. Each system backs up the previous system. These consist of electric engines, diesel engines, and batteries, to name only a few.

There have been no lawsuits against the plant and Nuclear One has paid over 4½ million dollars in taxes to the town of Russellville.

Nuclear power is the most efficient means of supplying energy in dollars and cents. As the energy crisis increases, the nuclear power plants will be the leaders in supplying the power to the ever growing need of mankind.



The Power Plant Reactor.



The Cooling Tower for the Unit Two System.