TECHNOLOGY

Atomic Reactors for Power

The United States is entering the atomic power age. The nation's first full-scale atomic power station for generating electricity is scheduled to go into operation soon.

By HOWARD SIMONS

➤ PITTSBURGH, the nation's great steel city, is about to become the nation's great atomic electri-city. Shortly, the world's first full-scale atomic power station devoted solely to civilian needs, the Shippingport Atomic Electric Generating Station, will go into operation.

When this happens, a new power age in the United States will be ushered in. For Shippingport will mark this country's first large atomic power plant designed to produce electricity to be used by the industries and home consumers of the Pittsburgh area. Other such atom-produced electricity has been used experimentally to light homes and buildings, notably in Arco, Idaho, West Milton, N. Y., Moorpark, Calif., and Vallecitos, Calif., but not one is on the grand scale promised by this giant station.

If all goes well, Shippingport will begin with a capacity of 60,000 kilowatts of electricity and then build up to a capacity of 100,000 kilowatts.

The Shippingport reactor is known as a PWR or pressurized water reactor. It is designed so that an atomic core, or charge of fuel, in which the fission process takes place, will heat high-pressure water. This will be used to convert a second supply of water into steam. The resulting steam, in the same manner as the coal-fired electric generating station, will produce the electricity.

In the making since Sept. 6, 1954, the Shippingport plant is a joint project of the Atomic Energy Commission and the Duquesne Light Company of Pittsburgh. Westinghouse Electric Corporation, under contract to the AEC, designed and developed the nuclear reactor.

A-Power Controversy

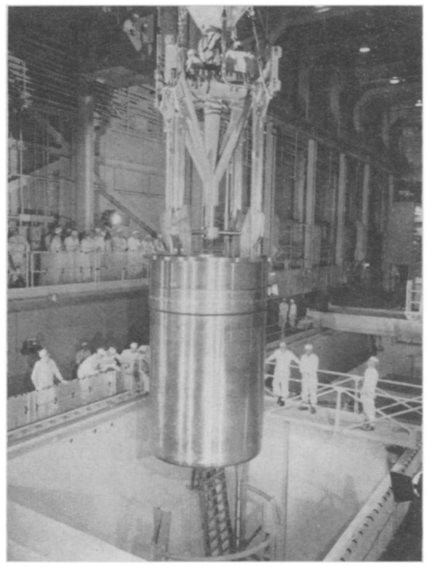
In addition to ushering in atomic power, the Shippingport station also puts under full steam the AEC's much-criticized and much-defended atomic power program. This is a program which for some time now has been caught in several cross-fires. These have been between Democrats and Republicans, between public power and private power, between the Joint Congressional Committee on Atomic Energy and the AEC, and between those critics who see us falling behind the United Kingdom and Russia in developing atomic power and those who see us leading the world.

The crux of these fights, upon which millions of dollars have been bet by both Government and industry, can perhaps best be summed up by two groups of the antagonists themselves.

In July, 1957, the Joint Congressional Committee had this to say of the AEC reactor program: "The Joint Committee over the years has not been satisfied that the AEC has been making sufficient progress in the development of prototype power reactors to test and demonstrate the practical problems of achieving economic nuclear power."

On Nov. 14, 1957, Chairman Lewis L. Strauss of the AEC and chief defender of his agency's reactor program said:

"At the present stage of the nuclear art, experiments on advanced reactors on the scale of 12 inches to the foot—that is to say, full-scale experiments—are not warranted. First must come study and research, followed by experimental plants such as this one [the Sodium Reactor Experiment at Santa Susana, Calif., the first non-military nuclear reactor, designed and built exclusively for civilian use, to produce electric power for distribution on a commercial basis by the Southern California Edison Co., and built by Atomics International] and following that, the building of 'first generation' prototype or demonstration plants of commercial size."



REACTOR'S HEART—This 58-ton nuclear core is being lowered into position in the nation's first full-scale atomic power plant at Shippingport, Pa. When this giant electrical generating station, a product of the Atomic Energy Commission, Westinghouse Electric Corporation and the Duquesne Light Company, goes into operation, the U. S. will come of age in the atomic power era.

Part of the controversy can be traced to the relative status of this nation, as compared to either the United Kingdom or Russia, in the generation of power from "fossil fuels," such as coal and oil. The U. S. is considered a power-rich nation and present estimates show that we can still produce power as cheaply, if not more cheaply, by using conventional methods. Both the United Kingdom and Russia are power-starved and, by necessity, must turn to new sources, such as atomic and solar energy.

The "Numbers Game"

Chairman Strauss maintains that "thus far we have resisted pressures to establish arbitrary goals of installed kilowatts for a set date, since we are not entered in any numbers game with anyone." However, he did report that by the mid-1960's there are expected to be some 18 or 20 nuclear power plants serving homes and industries across the nation.

Another AEC official, W. Kenneth Davis, director of reactor development, did enter a "numbers game," however, and predicted that by 1960 we would have 2,000,000 kilowatts in atomic power plants in operation. In contrast, the Joint Congressional Committee has charged that, according to their information, the figure will be less than 700,000 kilowatts.

The United Kingdom and Russia, on the other hand, have been in the "numbers game" for some time. The British hope to have from 5,000,000 to 6,000,000 kilowatts of atomic electricity by 1965. The Russians have announced plans to have 2,000,000 to 2,500,000 nuclear electrical kilowatts of capacity in operation by 1960.

Whether either England or Russia will reach these goals is not known, although it is known that both are trying very hard. Some doubt about the Russian effort was cast by Mr. Davis recently. He charged that the Soviet program strangely enough was beginning to look more and more like ours.

"The proposed Russian pressurized water reactor," he said, "is very interesting. Its design is remarkably similar to that of our Shippingport PWR in about every respect. . . ."

The best estimates for the number of nuclear reactors built, building or planned in the U. S. as of a year ago put the grand total at 345, of which 131 are low-temperature or not useful for power generation and the remaining 214 are high-temperature, power-producing reactors. This grand total includes both research and test reactors, as well as full-scale civilian power reactors for installation in foreign countries.

These reactors can be very big, like the Shippingport plant, or very small, like the Army Package Power Reactor currently in operation at Fort Belvoir, Va.

They can be designed to produce electricity for homes and businesses, again like Shippingport, or to test the effect of nuclear radiation on materials, such as the recently completed Engineering Test Reactor at Idaho Falls, Idaho.

They can be used to drive submarines like the pressurized water type in the Nautilus or teach students the workings of atomics.

But regardless of the type, size or purpose, when the Shippingport reactor goes critical, the United States will have come of atomic power age. If this time comes before year's end, when it is expected, it will be on the 15th anniversary of the first reactor in the world—Chicago Pile 1, started up in December, 1942.

Science News Letter, December 7, 1957

BIOLOGY

Tests Show Alcoholism May Be Due to Heredity

➤ BLOOD chemistry and urine tests have shown that alcoholism may be due to hereditary factors.

A group of Texas scientists told the National Academy of Sciences meeting in New York that they studied a group of male alcoholics and compared their biochemistry to that of a normal group who drank only in moderation.

Among the things compared were the total number of white blood cells, the amount of sodium, potassium and calcium in the blood, blood sugar, and the chemical composition of urine.

In all these characteristics, the alcoholics showed significant differences from the normals.

"While the evidence is far from complete, there is a strong presumption that a number of these items are under genetic control," the scientists said.

If this is true, then the ground work has been laid for tests that could be used to spot youngsters who are likely to develop into alcoholics.

The scientists reporting the findings were Drs. Roger J. Williams, Richard B. Pelton, Hertta-Maija Hakkinen and Lorene L. Rogers, The University of Texas, Austin.

Science News Letter, December 7, 1957

AGRICULTURE

Aphid-Resistant Alfalfa Developed by U.S.D.A.

➤ A NEW VARIETY of alfalfa, highly resistant to the spotted alfalfa aphid, can soon be grown, the U. S. Department of Agriculture has announced.

Named Moapa, the alfalfa was developed from resistant plants selected from a variety that is susceptible to the aphid. Each year the insect causes millions of dollars in damage to alfalfa. The variety is described as a non-winter, hardy alfalfa and is suitable for planting where the "parent" alfalfa variety, African, is grown.

Scientists with the crops research division of USDA's Agricultural Research Service, USDA's entomology research division and the University of Nevada's agricultural experiment station developed the new plant.

Science News Letter, December 7, 1957