Non-Military Uses of Atomic Energy

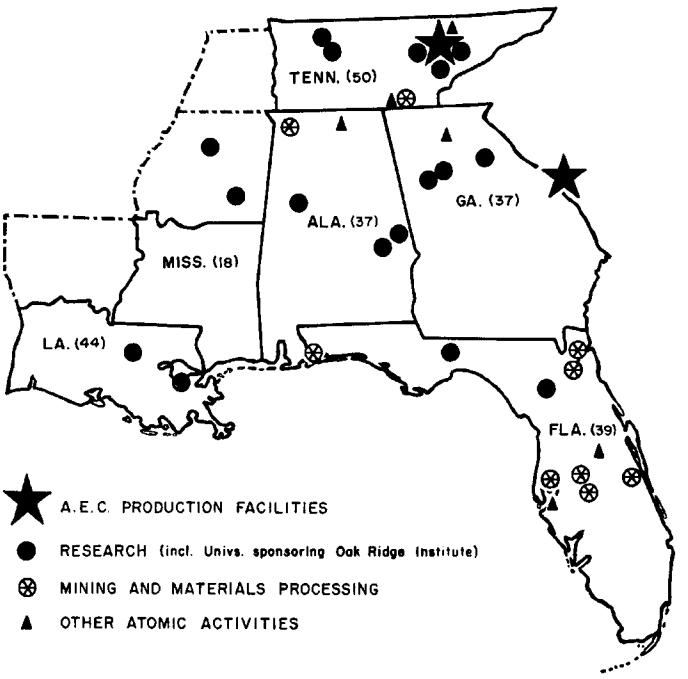
Scientists have long dreamed of releasing atomic energy. This dream finally became a reality at the University of Chicago in the fall of 1942—when the first atomic pile was built.

Until recently, however, work in this field was heavily cloaked with secrecy because it was directed almost completely toward defense efforts. Then in 1954, the new Atomic Energy Act lifted some of the secrecy and gave private industry the long-awaited green light to promote the peaceful uses of atomic energy. Although that was only a short while ago, it seems timely to explore the progress that has been made in the atomic field and to study the prospects.

The reason for the tremendous interest in atomic energy is that it is so highly concentrated and represents a virtually inexhaustible source of power. One pound of uranium-235, the basic atomic fuel, is equivalent in energy to 2,600,000 pounds of coal. This energy is harnessed in nuclear reactors, or atomic furnaces, in which the atoms are split. Heat produced in these reactors can be used to make steam to drive a generator and thus produce electric power. It can also be used for propelling a ship and for various heating purposes.

Nuclear reactors, however, also produce radiation. Elements such as iron and carbon that are non-radioactive in their natural state become radioactive when subjected to this radiation. The resulting atomic by-products are known as radioisotopes. These radioisotopes have been used to advantage by medicine, industry, and agriculture, but their greatest potentials have not yet been realized.

Location of Major Atomic Energy Facilities and Number of Isotope Users District States, August 1946-November 1955



Note—Numbers shown in parenthesis. Includes plants in operation and under construction. There may be other facilities in the area for which data are not available.

Status of Industry in Southeast

Radioisotopes have been the most widely used atomic product. From August 1946 until November 1955, there were 199 companies and institutions in District states using radioisotopes, which was 7 percent of the nation's total number. Through the Oak Ridge National Laboratory at Oak Ridge, Tennessee, this District is the nation's principal supplier of the 100 or more varieties of radioisotopes produced. Today this program is a million-dollar-a-year business operated on a non-profit basis.

Industry has found it relatively inexpensive to obtain radioisotopes and little capital investment is needed to make use of them. They are already saving United States industry about 100 million dollars a year, which explains why they have found their fastest growing use in industry. During the first eleven months of 1955, some 17 industrial firms in District states began using them, bringing the total number of industrial users in these states to 57.

By means of radioisotopes the thickness and density of such products as paper, rubber, and plastics can now be measured more quickly, more accurately, and less expensively than heretofore. Some paper mills, for example, by placing a radioactive source on the underside of a moving sheet of paper and a Geiger counter on the other can record the radiation penetrating the paper. Any variations in the amount of radiation in the paper indicate deviations in the thickness of the paper.

Other manufacturers obtain radioisotopes to test certain materials. Automobile manufacturers have found them helpful in detecting flaws in castings and in measuring engine wear. Other applications include locating underground formations of oil, signaling the arrival of various liquids that flow through pipelines, studying piston wear, and aiding in petroleum cracking.

Radioisotopes have also proved invaluable to medicine and agriculture. Eighty-seven medical institutions and physicians in District states between August 1946 and November 1955 were using them in research, diagnosis, and therapy—the most publicized medical use being in the treatment of cancer. District farmers have gained from radioisotope applications, as exemplified in the results of a recent study on this use in cattle nutrition by the College of Agriculture at the University of Tennessee.

Scientists have proved conclusively that electricity can be generated from atomic energy, although that development is still in an early stage. There are as yet no commercial nuclear plants operating in this country.

Although the pilot nuclear plants being planned or under construction at the end of 1955 will be located outside this District, some progress toward developing nuclear fueled power in this area has been made. The Florida Power and Light Company, the Tampa Electric Company, and the Florida Power Company recently an-

nounced that they would explore the economic feasibility of a nuclear plant of perhaps 200,000 kilowatt capacity, which may be in service in Florida in 1962 or 1963. The Alabama, Georgia, Mississippi, and Gulf Power Companies and the Southern Company have gained technical know-how from their participation in a power project planned for Michigan. The Tennessee Valley Authority and Seminole Electric Cooperatives Association for some time have been studying the development of nuclear power.

In the field of atomic propulsion, development in this country has been largely limited to the atomic submarine. Lockheed Aircraft Corporation, however, has plans for a large nuclear test site in Dawson County, Georgia, where it hopes to develop an atomic powered plane.

In building reactors, on the other hand, the District has already played a prominent part. The Oak Ridge National Laboratory (a U. S. Atomic Energy Commission installation) has built many different reactors currently being used and is designing and planning others.

The atomic industry has also attracted to this region fabricators of components and specialized materials for reactors as well as plants that make nuclear instruments. The total number of District firms actively engaged in the entire atomic energy field, however, is far smaller than that in the more heavily industrialized areas. This is suggested by the number of permits issued by the Atomic Energy Commission to persons desiring classified information. Only 34 of the 804 permits granted from April 20, 1955, to April 30, 1956, went to persons in District states.

Future Prospects

Rapid growth is foreseen for this District's atomic energy industry. Radioisotopes will certainly be used more and more. A particularly promising field is in the preserving of food. Since food processing is a major District industry, the potential impact of this discovery is great.

As the region is becoming increasingly industrialized, the production of power from atomic energy, however, may have the greatest future impact. This is especially so because low-cost hydroelectric power and gas are becoming increasingly scarce; yet District power needs, according to the Federal Power Commission, will be about 250 percent greater in 1980 than they were in 1954.

Because the cost of nuclear power at first is expected to be considerably greater than that of conventional fuel, the first nuclear plants are likely to be built in high-cost power areas like southeastern Georgia or inland portions of Florida. Not until pilot plants have begun to operate and different types of reactors now being built have been tested, will we have any idea when nuclear power plants can compete with the conventional fueled plant. One estimate, made by the McKinney panel to the Joint Congressional Committee on Atomic Energy, is that they will become competitive around 1965. Furthermore, this panel estimates that by 1975 atomic power may range from 5 to 15 percent of total electric capacity.

Although future progress seems assured, growth may be held back until several problems are solved. One of those is likely to be a shortage of personnel. If the minimum demands of industry in this area are to be met by 1965, Southern schools, according to many observers, must graduate annually three times as many scientists and engineers as at present. The number of nuclear specialists also must be greatly expanded—a program in which the Oak Ridge Institute of Nuclear Studies, sponsored by 34 Southern universities, will undoubtedly play an important part.

Great quantities of raw materials, moreover, will be needed. An increasing share of these is likely to come from this District, which already is a major processor of uranium at the Union Carbide Nuclear Company's Oak Ridge Plant. Although the West is still the nation's principal source of uranium ore, small amounts are being produced in Florida as a by-product of phosphate-rock mining. Another element that may be used to generate atomic energy, thorium, has been found in monazite sands of Florida. Soon to be produced in that state is zirconium, a material used in reactor construction.

Cost of research, however, is not believed to be a limiting factor to future growth. This District's two Atomic Energy Commission installations (Oak Ridge Institute of Nuclear Studies and Oak Ridge National Laboratory), together with 17 installations outside this area, can be expected to contribute heavily to atomic research, as can private industry. Much basic research is also likely to come from educational and research institutions. In November 1955, the AEC was financing 54 such institutions in District states, which was 8 percent of the nation's total.

Being a new field, atomic energy will require large sums of capital. District bankers, who have already taken an active interest in this field, can be expected to help satisfy the financial need and thereby contribute to this area's future atomic progress.

HARRY BRANDT

Bank Announcements

On July 1, the Bank of Smyrna, Smyrna, Georgia, a nonmember bank, began to remit at par for checks drawn on it when received from the Federal Reserve Bank. Officers are D. C. Landers, President; B. F. Reed, Jr., Vice President; H. L. Holliday, Cashier; and W. C. Burger, Assistant Cashier. It has capital of $200,000 and surplus and undivided profits of $72,832.

The Choctaw Bank of Butler, Butler, Alabama, a nonmember bank, began to remit at par on July 2. Albert H. Evans, Jr., is President; O. D. Mason, Jr., is Cashier; and Beatrice Lanier and Allen Abston are Assistant Cashiers. Capital amounts to $100,000 and surplus and undivided profits to $251,781.

On July 28, the newly organized First National Bank of Eustis, Eustis, Florida, opened for business as a member of the Federal Reserve System. Edwin Mead is President; Robert E. Warfield, Jr., Vice President and Cashier; and Robert E. Kilpatrick, Assistant Cashier. Capital totals $150,000 and surplus $100,000.