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SCIENTIFIC INTELLIGENCE REPORT

THE YUGOSLAV ATOMIC ENERGY PROGRAM

CIA/SI 41-58

25 November 1958

CENTRAL INTELLIGENCE AGENCY

OFFICE OF SCIENTIFIC INTELLIGENCE

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Scientific Intelligence Report

THE YUGOSLAV ATOMIC ENERGY PROGRAM

NOTICE

The conclusions, judgments, and opinions contained in this finished intelligence report are based on extensive scientific intelligence research and represent the final and considered views of the Office of Scientific Intelligence.

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PREFACE

This study supersedes the chapter on Yugoslavia in CIA/SI 92–56, *Nuclear Energy Activities in Foreign Countries, Volume II, Western Europe,* 22 October 1956, SECRET/NOFORN. It also covers estimated Yugoslavia uranium ore production. This study is based on information available as of 1 June 1958.

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FIGURE

THE YUGOSLAV ATOMIC ENERGY PROGRAM

PROBLEM

To assess the objectives and capabilities of the Yugoslav atomic energy program and the resources and facilities available to achieve these objectives.

CONCLUSIONS

1. Yugoslavia has a small atomic energy program which currently consists almost entirely of basic nuclear research. The more perceptible objectives of the program include the increased use of radioactive isotopes and the eventual use of nuclear propulsion for ships.

2. The organizations and facilities required for this limited program are available and can be expanded as needed.

3. Although originally interested in nuclear electric power, the Yugoslavs now realize that the application of nuclear electric power is not economically feasible in Yugoslavia, which has large amounts of untapped hydro-electric power resources.

4. Yugoslavia currently has no capability to produce nuclear weapons and probably will continue to devote its resources solely to the peaceful application of atomic energy.

5. Yugoslavia is dependent upon external aid to advance its atomic energy program and, currently, is receiving aid from the USSR and Western nations. Although Yugoslavia will probably continue to enlist the support of several countries, its program would not be adversely affected by reliance on only one country for aid.

SUMMARY

The Yugoslav atomic energy program as originally conceived provided for constructing, staffing, and equipping three nuclear research institutes. These institutes, now in operation in Vinca, Zagreb, and Ljubljana, are being provided with cyclotrons, accelerators, generators, a reactor, and the necessary electronic and chemical equipment to permit a wide latitude of basic nuclear research.

Imported radioactive isotopes have been in limited use for several years in Yugoslavia. Operation of the research reactor, due to begin at the end of 1958, will permit the production of a wide range of radioactive isotopes for use in industry, medicine, and agriculture. Centers for the control and distribution of isotopes are being established in many locations in Yugoslavia.

In 1957, Yugoslavia began preliminary studies of nuclear propulsion. Representatives of shipbuilding firms, other industry, and the nuclear research institutes have formed groups to study the proposed construction of a nuclear propelled vessel.

Although frequently expressing a desire for nuclear electric power plants, Yugoslavia has as yet made no plans for such construction. With large amounts of untapped hydro-electric resources available, the Yugoslavs recognize that it would be better to develop these resources than to construct nuclear power plants, which do not yet approach the economy of operation of hydro-electric plants.

Yugoslavia has, at this time, none of the plants which are required to produce weapons-grade nuclear material. Although provisions have been made for the production of a plutonium separation plant at Vinca, no progress has been made in attempts to obtain technical information and equipment from the Soviet Union for full-scale plutonium processing. Until such a plant is in operation, the irradiated fuel from the research reactor will probably be returned to the USSR, which will undoubtedly retain the plutonium.

Yugoslavia has received most of the hardware for its atomic energy program from the USSR while receiving isotopes and training from the West. However, the USSR has offered to train Yugoslav personnel, and the United States has offered to sign a research bilateral agreement which would permit the sale of hardware.

DISCUSSION

SCOPE OF THE YUGOSLAV ATOMIC ENERGY PROGRAM

In the immediate post World War II period, Yugoslavia took the initial steps in the development of an atomic energy program. At that time, there were very few Yugoslavs who were capable of making significant contributions to the nuclear sciences. These individuals had been trained in foreign countries, because prior to this time, Yugoslavia had no physics research institutes. The physics departments of the various universities were occupied almost solely with the training of basic physics teachers for secondary schools.

With this situation in mind, the Yugoslav atomic energy program was initially planned along three major lines: 1) constructing nuclear research institutes; 2) training nuclear scientists and specialists; and 3) finding the necessary raw materials and developing the processes to use this material.[1]

By 1955, these three objectives had in general been gained — three nuclear research institutes had been established and were in operation, numbers of scientists had been trained in foreign countries and within the Yugoslav institutes, and deposits of low-grade uranium had been located.

The second phase of the atomic energy program started with the establishment of a Federal Commission for Nuclear Energy. Under this Commission, the Yugoslav program was to concentrate on the further training of physicists and workers; equipping institutes with advanced equipment; increasing cooperation with foreign nuclear science institutes and organizations; performing basic research in atomic energy; and producing isotopes for use in agriculture, industry, and medicine.[1] Currently, these objectives are being accomplished and the Yugoslavs are beginning to investigate the production of nuclear materials.

Yugoslavia has also given thought to the possible uses of nuclear power and nuclear propulsion. According to a Yugoslav paper on power requirements presented at the Geneva Conference in 1955, a shortage of lignite for thermal power plants will develop in Yugoslavia by 1975. Even though by that

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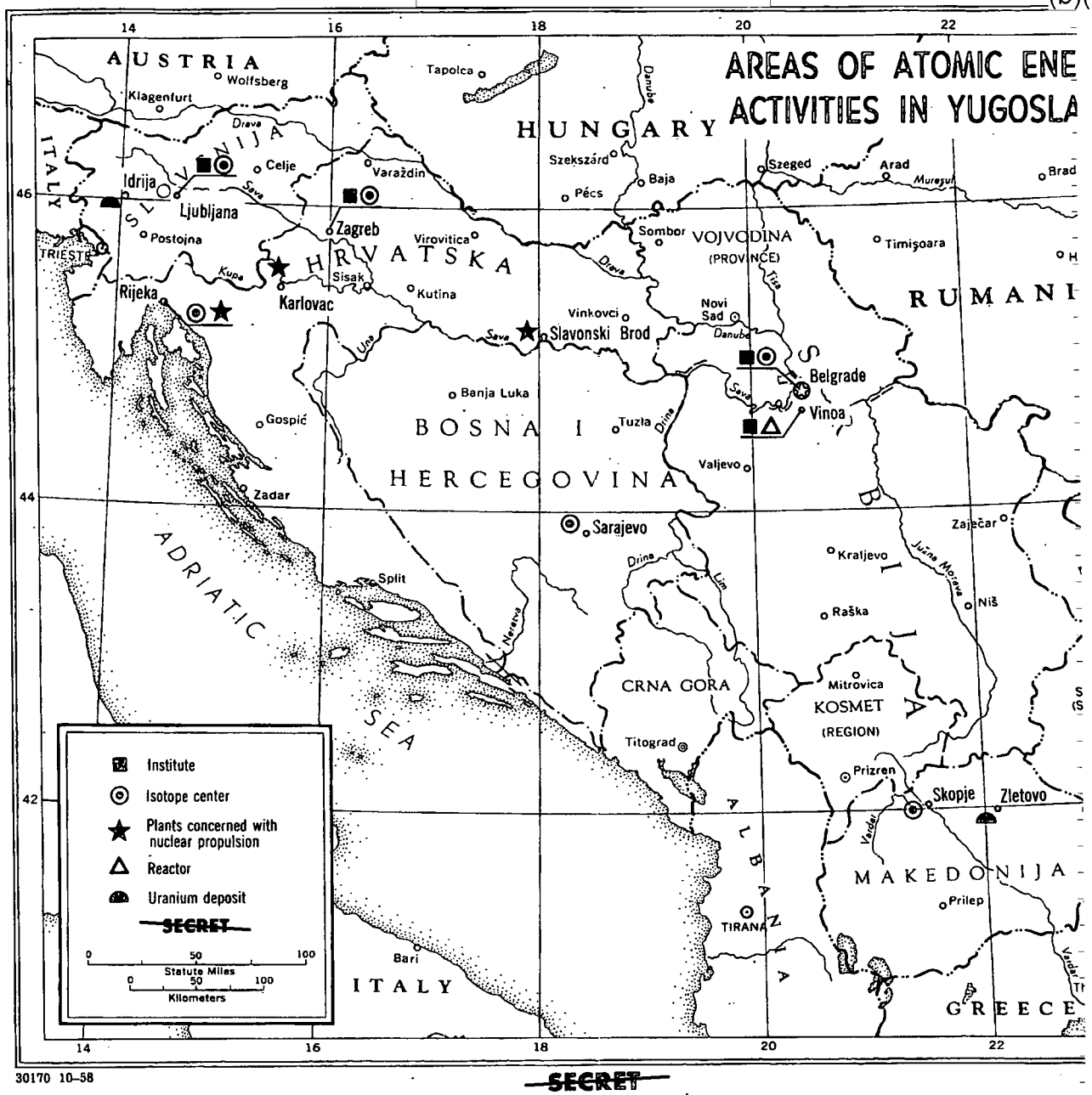

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time hydro-electric resources will be utilized only to the extent of 20 percent of capacity, it was suggested that nuclear energy would be used to fill the increasingly widening gap between the demand for power and the supply by conventional power facilities.[2] Further interest in nuclear power was demonstrated in September 1956, when a conference was held on the uses of nuclear energy for electric power. While one participant predicted that the first nuclear power plant would be constructed in Yugoslavia in 7 to 10 years, it was recognized that a great deal of research and industrial ground-work would be necessary before definite plans could be made.[3] Despite these predictions, the Yugoslavs now realize that it is both expedient and economical to develop unused hydro capacity before trying to initiate a large scale nuclear power program.

In the summer of 1957, the first efforts to develop nuclear propulsion in Yugoslavia were initiated. An investigating team composed of representatives from shipyards and other industry was assembled to begin studying the possibilities of the construction of nuclear powered ships.[4] Preliminary plans of this group called for the organization of a production pool to construct a ship of 40,000 to 50,000 tons displacement at the Treci Maj (3rd of May) Shipyard at Rijeka, with the Djuro Djakovic Plant at Slavonski Brod producing the reactors and the Jugoturbine Plant in Karlovac producing the turbines. This group also expressed a desire to send experts abroad for training and for studying the propulsion achievements of other countries.[28] In late 1957, the Federal Commission for Nuclear Energy began to consider the prospects for nuclear propulsion and decided: 1) that a systematic study of the problem should be made, and 2) that cooperation among the Commission, the Shipbuilding Institute at Zagreb, and the production pool at Rijeka should be established and maintained.[21 29] It has been reported that in late 1957 and early 1958, the atomic section of the Treci Maj Shipyard was visited by members of the three Yugoslav nuclear physics institutes, by members of the Federal Commission, and by Soviet nationals associated with the reactor construction at Vinca.[30–32]

ORGANIZING AND FINANCING THE PROGRAM

Federal Commission for Nuclear Energy

On 19 March 1955, a decree of the Federal Executive Council of Yugoslavia established the Federal Commission for Nuclear Energy. This decree stated the following objectives:

"(1) The Commission shall help, coordinate, and direct the work on development of nuclear sciences and conduct all work in applied sciences in this field.

(2) The Commission shall:

a) introduce the plan of work in the development of nuclear energy and undertake measures for its implementation;

b) fix requirements in connection with the development and utilization of nuclear energy at the time of the framing of the Federal Social Plan and the Federal Budget and submit proposals to the Federal Executive Council for these purposes;

c) prepare the draft estimate of revenues and expenditures of the Commission.

(3) Within the framework of its tasks, the Commission shall maintain and develop connections with corresponding organizations and institutes in foreign countries."

Alexander Rankovic, vice president of the Federal Executive Council, was appointed president of the Commission. At the same time, two vice presidents, a secretary, and eleven members were appointed. The president, the two vice presidents, the secretary, and three of the eleven members were named to the presidium of the Commission to execute the orders of the whole Commission.[6] In May 1957, an additional member was added to the presidium and the number of members not on the presidium was increased to 17.[7]

To accomplish the functions assigned to it, the Commission has set up various organizational units to study problems connected with

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the work of the Commission, apply the acts of the Commission, supervise the establishments that execute tasks assigned by the Commission, and issue resolutions on duties within the scope of the Commission. These organizational units are as follows: the Directorate of Nuclear Raw Materials; the Section for Scientific Research; the Section for the Production and Application of Atomic Energy; the Division for Contacts with Foreign Countries; the Division for Protection from Radiation; and several administrative divisions.[6]

Government Appropriations to the Atomic Energy Program

Prior to 1957, there were no provisions in the Yugoslav federal budget specifically earmarked for atomic energy. The Yugoslav federal budget for 1957, however, provided 3.5 billion dinars (approximately $5,950,000) for the "development of nuclear energy." [8] The State Secretary for Financial Affairs has announced that the 1958 budget will include 5 billion dinars (approximately $8,500,000) for the "peaceful uses of atomic energy." [9]

Western observers who have visited the three major nuclear physics institutes in recent years have commented that these institutes, in comparison with other Yugoslav institutes and universities, seem to have a great deal of money available for training, equipment, and physical plants. This money seems to be available in both dinars and foreign exchange. Since it has become easier to deal with the West in recent years, the Yugoslavs have purchased from Western manufacturers top quality complex instruments and equipment that they could not produce themselves.[10 18]

NUCLEAR PHYSICS RESEARCH FACILITIES

Boris Kidric Institute of Nuclear Sciences, Vinca

This is the oldest and largest of the three main nuclear research institutes. It was established as an independent institute in 1947 by a resolution of the Federal Government. It was directed by Stephan Dedijer until 1954, when he was replaced by the current director, Vojko Pavicic. Pavle Savic, one of the best known Yugoslav physicists, is the president of the scientific council of the institute.

The institute is organized into the following divisions: Nuclear Reactors; Control of Reactors; Fission Products; Nuclear Impurities; Production and Practical Use of Radioactive Isotopes; Radiation Chemistry; Optical Methods; Nuclear Metallurgy; Electromatic Separation and Mass Spectroscopy; Physical and Chemical Separation of Isotopes; Accelerators; Electronics; Theoretical Physics; Protection from Radiation; Design; Technical; Maintenance; Planning; and Documentation.

Major equipment in operation at the institute includes a 0.2 Mev Van de Graaff generator, a 1.5 Mev Cockroft-Walton accelerator, a 60 curie cobalt 60 source, a mass spectrograph, a 120 channel analyzer, and a critical assembly.

On 17 May 1958, Tito officiated at the opening ceremony attending the operation of the critical assembly.[33] This facility was designed and built by the Yugoslavs but uses natural uranium and heavy water provided by the Soviets under the Soviet-Yugoslav agreements on nuclear energy.[34] According to one source, the pile contains 2 metric tons of natural uranium and 6 metric tons of heavy water.[35]

Still under construction at the institute is the 7 to 10 MW (thermal) research reactor purchased from the Soviet Union, also under the Soviet-Yugoslav agreements on nuclear energy. This reactor is of the material test type and is designed to have a maximum thermal flux of 8×10^{11} n/cm^2/sec.[11] It has been reported, however, that a maximum thermal flux of 5.5×10^{13} n/cm^2/second is expected.[37] The reactor is to be heavy water moderated and cooled and to use 2 percent enriched uranium in the form of aluminum clad tubes. The reactor tank and the main heavy water cooling system are stainless steel. Secondary cooling is provided by water pumped from the Danube and circulated

through double-tubed heat exchangers.[11] The total weight of the heavy water coolant and moderator is 7 metric tons. One fuel loading of the 2 percent enriched uranium consists of 69 fuel elements at start-up. When fully poisoned, 83 fuel elements are required. The actual mass at start-up is 285 kilograms and when fully poisoned is 340 kilograms.[35–37] Originally scheduled for completion in 1957, it has now been stated by the secretary of the Nuclear Energy Commission that the reactor will be completed by the end of 1958.[12] In the first quarter of 1958, however, deliveries by the USSR were several months behind schedule and the current strained relationship between Yugoslavia and the USSR may delay completion even longer.[47]

At the Boris Kidric Institute, research is also carried out on many subjects associated with nuclear physics, among these are basic nuclear physics, effects of radioactivity, uranium ore separation, radioactive material processing, and reactor design.

This institute has been visited many times by Western scientists who have been permitted to inspect all of the institute with the exception of the warehouses containing Soviet reactor equipment and materials; however, recent information indicates that security measures have been increased.[13]

Rudjer Boskovic Institute, Zagreb

This institute was established by the Federal Government in 1951. Velimir Novak is director of the institute and Professor Ivan Supek is president of the administrative council and a member of the scientific council. The institute is organized into three major divisions: Accelerators, Electronics, and Reactors. These divisions and their various subdivisions perform research on biochemistry, heavy water, fissionable material processing, and associated subjects.[6] The major piece of equipment at Zagreb is a 16 Mev cyclotron that is nearly completed. An electron microscope and a neutron generator are currently in use, and a pilot plant for the separation of uranium ore is in operation.[10]

Josef Stefan Institute, Ljubljana

The Josef Stefan Institute was originally founded in 1947 as an institute for physics of the Slovenian Academy of Sciences. It was later taken over by the Federal Government and enlarged as an independent institute. The director of the institute is Karol Kajfez and the president of the administrative council is Dr. Anton Peterlin. This institute is organized into a series of laboratories: Analytical, Materials, Uranium and Hexafluoride, Heavy Water, Uranium Concentration, Mass Spectrometry, Electronics, Reactor Measurements, Radio Biochemistry, Organic Chemistry, Accelerators, and Nuclear Physics.[6] Major equipment at Josef Stefan consists of a 2 Mev Van de Graaff accelerator and a 31 Mev betatron.[10]

One of the major problems assigned to this institute is research on the production of heavy water. Also under study are certain nuclear reactor problems and analytical methods of quantitative determination of the uranium content of ores.[14]

Institute for the Technology of Mineral Raw Materials, Belgrade

This institute was established by the Federal Executive Council in June 1955. Although only indirectly concerned with nuclear physics, it is directed and controlled by the Federal Commission for Nuclear Energy, which also designates the top administrative personnel. Currently, Engineer Bela Bunji is director, and Engineer Milan Jovanovic is president of the administrative council. This institute is responsible for the improvement of known processes and the development of new processes for obtaining nuclear fuels from raw materials. It is also responsible for the establishment of industrial production of nuclear raw materials.[6]

Relationship of Institutes to Federal Government

All four of the above institutes have some features in common. All are controlled and directed by the Federal Commission for Nuclear Energy. The Commission appoints the

directors and members of the scientific and administrative councils of the institutes, and representatives of all four institutes are among the members of the Commission. As independent institutes, all are financed directly by the Federal Government and are associated with their neighboring universities only through leading personnel who hold positions in both the institutes and universities.

OPERATIONAL FACILITIES

Uranium Mining

In 1952, at the request of the Yugoslav government, a geologist of the U.S. Geological Survey made a field examination of numerous suspected uranium deposits in Yugoslavia. The two most promising deposits at that time were the Idrija mercury deposit in Slovenia and the Zletova lead-zinc mine in Macedonia. At these mines, low-grade uranium might be recovered as a byproduct from ores believed to have an average uranium content of 0.01 percent. The geological setting of much of Yugoslavia, particularly Serbia and Macedonia, is favorable for uranium mineralization, and the Yugoslavs are presently systematically prospecting for radioactive materials. It is not known at this time how much ore is being obtained, but it is estimated that the Yugoslavs are mining annually sufficient ores to contain about 100 tons of recoverable uranium metal.

Uranium Milling

Pilot plant production of U_3O_8 has been proceeding for several years in Yugoslavia. The Federal Commission for Nuclear Energy considers that the results achieved will permit them to construct major uranium mills "in the coming years." [15]

Uranium Refining and Conversion

No plants for the production of uranium salts or metals are in operation in Yugoslavia. Research on the processes involved is being done at the institutes at Vinca, Ljubljana, Zagreb, and Belgrade.[6] [10] In 1957, the Institute for the Technology of Mineral Raw Materials contacted a U.S. firm regarding the engineering, design, and procurement of equipment and materials for a uranium metal pilot plant with a capacity of 20 tons per year to be erected in Yugoslavia. The U.S. firm submitted a proposal for this plant but it has not as yet been accepted or turned down.[17]

Heavy Water

No heavy water production facilities are in operation in Yugoslavia. The Josef Stefan Institute, however, has done laboratory scale work on the separation of D_2O by fractional distillation, slow evaporation, and cascade electrolysis.[10]

Reactors

Other than the exponential pile at Vinca, the only reactor in Yugoslavia is the 7 to 10 MW material test reactor currently under construction at Vinca. No other reactors are known to be scheduled for construction.

Fissionable Material Processing

No plants for the extraction of plutonium and fissionable materials from irradiated fuel elements are in operation. Provisions have been made for the construction of a separations plant adjacent to the reactor at Vinca; but, as of June 1957, the construction of this building had not begun.[11] Yugoslav requests for technical information and equipment for full scale plutonium processing from the Soviet Union have been refused; however, the Soviets have promised to give advice on the laboratory processing of plutonium that is being done at Vinca and Zagreb.[6]

MANUFACTURE OF NUCLEAR EQUIPMENT

Industrial Production

Under the current Yugoslav program, few plants have been required to produce nuclear equipment. The one plant most frequently mentioned is the Rade Koncar Electric Equipment Plant in Zagreb. This plant has produced much of the electrical equipment for the various institutes and supplied many parts for the 16 Mev cyclotron at Zagreb.[18] In con-

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nection with the future use of nuclear propulsion for ships, it has been announced that the Djuro Djakovic Plant in Slavonski Brod will produce nuclear reactors.[19]

Production at the Institutes

In the years when the various institutes were being established and equipped, it was virtually impossible to import Western instruments and equipment due to foreign exchange limitations and trade restriction. As a result, the workers of the institutes had to produce much of their own equipment. Each institute has a well-equipped workshop where nearly all equipment is produced. At the Rudjer Boskovic Institute, for instance, Geiger-Mueller tubes are produced for all three institutes and many of the parts for the cyclotron were made. At the Boris Kidric Institute, the scientists and technicians constructed their own mass spectrograph, 120 channel analyzer, and Cockroft-Walton generator.[10]

NUCLEAR APPLICATIONS: RADIOACTIVE ISOTOPES

Radioactive isotopes have been used for several years in Yugoslav industry, medicine, and research. The majority of these isotopes were purchased from the U.K. facility at Harwell; some were purchased from the U.S. AEC; and a few were produced by the accelerators in operation in Yugoslavia.[20 23] In 1956, it was realized that the increased use of isotopes and the attending procurement and distribution tasks would create many problems if definite controls and procedures were not established. Thus in 1957, the Federal Commission for Nuclear Energy established a fund for the purchase of isotopes and made certain regulations to be complied with before an institute, industrial enterprise, or hospital could receive isotopes. Simultaneously, the Commission provided for the establishment of various isotope "centers." Centers for the industrial uses, primarily defectoscopy (use of radioactive isotopes to defect faults in weldings and castings), have been set up Belgrade, Sarajevo, Ljubljana, and Rijeka. The first center for the application of isotopes in medicine was established in Belgrade, and similar centers are planned for Zagreb, Ljubljana, Sarajevo, and Skoplje. Centers for agricultural applications are planned for Belgrade, Zagreb, and Ljubljana.[21 23]

NUCLEAR TRAINING

Original Domestic and Foreign Training Programs

Domestic training in the nuclear sciences in Yugoslavia so far has been provided primarily through the operation of the three nuclear physics institutes. Young scientists and technicians at these institutes, through on-the-job training and associated courses at the neighboring universities, have received a basic education in nuclear physics. For more advanced training, these scientists and technicians have been sent to various facilities in foreign, generally Western, countries. Approximately 20 Yugoslavs have studied in the United States at such places as the AEC's Oak Ridge Institute of Nuclear Studies, the AEC's International School of Nuclear Science and Engineering at Argonne National Laboratory, and at various universities. Approximately 10 Yugoslavs have studied in France, Belgium, Denmark, and Sweden. While it has been reported that the engineers scheduled to operate the Vinca reactor would be sent to the USSR for training, only one is definitely known to have returned to Yugoslavia after taking a course in reactor operation.[11 24]

The Yugoslavs prefer training in the West rather than in the USSR for several reasons. Yugoslav officials have stated that in the West much more information was available to the students; the USSR, they say, has withheld information as classified that would be completely open in the West. An additional factor is the frequent change in the political relationship between the USSR and Yugoslavia. Several times in the past, a Yugoslav has gone to the USSR during a period of good relations and then been forced to remain idle or return home when political relations cooled.

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Recent Domestic Training Programs

As more of the scientific apparatus and equipment nears an operational point and the Yugoslav program expands, the shortage of trained scientists and technicians is again becoming acute. A program of training at various Yugoslav institutes and universities has recently been initiated in an attempt to train the numbers of scientists and technicians who will be required to carry out the expanding nuclear energy program.

In 1956, the Boris Kidric Institute established an isotope training school. The course, which lasts for 7 to 8 weeks, covers all aspects of the use of isotopes, from the study of radiation effects on living organisms to defectoscopy. In 1957, 105 persons attended the school, and about 130 were due to attend in 1958.[25]

In October 1957, the Rudjer Boskovic Institute, in cooperation with the University of Zagreb, began a post-graduate program in nuclear physics. Among the subjects to be covered were electricity; inorganic, structural, and radionuclide chemistry; and the chemistry and biology of radiation. In the first year, 48 students are due to graduate from this program.[26]

During the 1958–1959 academic year, the University of Zagreb plans to establish a Division of Technical Physics and Nuclear Technology. A variety of subjects in the nuclear sciences will be offered in a course lasting several years.[27]

FOREIGN COLLABORATION

General

The Yugoslavs have sought assistance from both the East and the West in the development of their atomic energy program. The need for external help has been recognized by the Yugoslavs since the beginning of their interest in atomic energy, and funds were quickly made available by the Government to send students to work in many of the nuclear centers of the world. During the period immediately following World War II, promising young scientists were sent to nuclear research institutes in Western Europe and the United States. With the Soviet agreement of January 1956, the Yugoslavs turned to the East for assistance in obtaining the hardware needed for their program.[41] Although this agreement also provided for students to be trained in Soviet institutes, there has been continued dependence on Western facilities for most advanced nuclear training.[40]

USSR

From the pure "hardware" point of view, the Soviets have provided the Yugoslavs with an impressive amount of aid. The USSR provided the research reactor now under construction at Vinca and also agreed to provide natural and enriched uranium and heavy water for both the reactor and the critical assembly which the Yugoslavs constructed themselves. All of this equipment and material was purchased from the Soviets after many negotiations regarding the price, which the Yugoslavs regarded as excessive. By purchasing the equipment and materials the Yugoslavs hoped to limit the number of "strings" attached to the Soviet agreement.[39]

The Soviets have refused to give the information or direct assistance needed to construct a chemical processing plant to handle irradiated fuel elements from the Yugoslav reactor. They did agree, however, to provide the equipment for a hot and semi-hot chemical laboratory.[35 36] Such equipment, in effect, gives the Yugoslavs the capability to develop a chemical separations process.[38]

United States

The Yugoslavs originally attempted to obtain a research reactor from the United States but turned to the USSR because of U.S. insistence on the inclusion of "safeguard" provisions (ones ensuring only peaceful uses) in any bilateral agreement. Although unwilling to agree to the terms of a bilateral agreement with the United States, Yugoslavia has continued to send students to the U.S. AEC

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atomic training centers at Argonne and Oak Ridge. Recently, the use of U.S. training facilities was opposed by some officials in Yugoslavia, and a policy appears to have been established that provides that students will be sent to the United States only when equivalent training cannot be obtained in European centers.[41] The major factor behind this policy is apparently the higher travel and living expenses in the United States as compared to Europe. In spite of earlier failures to obtain hardware in the United States, the Yugoslavs have shown recent interest in obtaining information on uranium treatment and in purchasing experimental and power reactors.[45]

Satellite Nations

Before the fall of 1956, there was little interchange between Yugoslav and Satellite scientists. Since then, there have been fairly extensive exchanges, particularly with Poland and Czechoslovakia. A Yugoslav delegation traveled to Czechoslovakia in November 1956 where they reportedly received a cool official reception but had satisfactory relationships on a scientist-to-scientist basis.[35] On 5 January 1957, the Yugoslavs announced that an agreement had been reached, with a Polish delegation visiting Yugoslavia on cooperation in the exploitation of nuclear power for peaceful purposes. The agreement calls for cooperation in research in the use of radioactive isotopes in industry, agriculture, medicine, and biology and the exchange of experiences in geological research and technology concerning nuclear raw materials.[44] The initiative was apparently on the part of the Poles, as the Yugoslavs feel that the Poles have little to offer.[41]

Other Countries

Yugoslavia has shown interest in making contacts in the nuclear field with many nations. In addition to countries already mentioned, Yugoslav students are studying or working in institutes in Germany, Denmark, the UK, France, and Sweden.[41] Yugoslavia has held several international physics conferences, among which was a conference in July 1957 with participation by representatives from France, Italy, Sweden, the USSR, West Germany, Poland, Finland, and Israel.[42] In June 1957, the Secretary General of the Egyptian AEC visited Yugoslavia.[46] In December 1957, Pavle Savic visited Delhi for the announced purpose of getting acquainted with India's activities in the atomic energy field and to strengthen contacts between the Yugoslav and Indian nuclear research organizations. Savic's visit was in return for an earlier one to Yugoslavia by India's Secretary of the Department of Atomic Energy. In a press statement, Savic indicated that Yugoslavia has agreements with the USSR, Poland, France, Greece, and Egypt for cooperation in the field of atomic research. He stated further that Yugoslavia was prepared to sign similar agreements with other countries.[14]

International Organizations

Yugoslavia is a member of CERN (European Organization for Nuclear Research) and in December 1956 was elected to the Committee of the Council of CERN.[43] Representatives from Yugoslavia took part in the Conference on the Statute of the International Atomic Energy Agency in New York in 1956, and on 17 September 1957, Yugoslavia ratified the Statute and thus became a member of the Agency.

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