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ADVANCES IN THE APPLICATION OF NUCLEAR ENERGY
FOR PEACEFUL PURPOSES

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UKRAINIAN SOVIET SOCIALIST REPUBLIC

1. During the period of Soviet power, the Ukrainian Soviet Socialist Republic, in close collaboration with all peoples of the USSR, has made considerable economic, scientific and cultural progress and substantially increased its standard of living.
2. Scientific and technical progress in the Ukraine has been reflected in the continuous expansion of nuclear research and advances in the use of atomic energy for scientific research in general and also in the national economy.
3. In the immediate post-war years, nuclear research in the Ukraine centred on the Physico-Technical Institute and the Institute of Physics of the Academy of Sciences of the Ukrainian SSR. In recent years, it has also been carried out at the Institute of Theoretical Physics and the Nuclear Research Institute of the Academy of Sciences of the Ukrainian SSR. Work carried out in the nuclear physics departments at universities is also playing an important part in the development of nuclear research.
4. The Nuclear Research Institute of the Academy of Sciences of the Ukrainian SSR in Kiev is constructing a large accelerator complex consisting of an isochronous cyclotron for producing 7-100 MeV protons, a 5-20 MeV tandem generator and a measuring centre. In addition, a complex radioelectronics unit for analysing nuclear processes is being built. The ALMA-10⁶M associative pulse analyser, which can sort information in as many as a million channels simultaneously, has been awarded gold medals at international exhibitions.
5. Nuclear physics research in the Ukraine was at first conducted mainly in the intermediate- and low-energy ranges, but in recent years a great deal of work has been done in the high-energy range. Considerable progress has been made in the study of the interaction of protons, deuterons and heavier particles with nuclei. In addition, the so-called "isotopic effect" has been observed and carefully investigated.
6. In the mid-sixties the Physico-Technical Institute of the Academy of Sciences of the Ukrainian SSR embarked on fundamental nuclear research with the aid of high-energy electrons and photons.

7. Institutes of the Academy of Sciences of the Ukrainian SSR and Ukrainian universities are investigating a wide range of problems connected with the use of radioisotopes and nuclear radiation in materials research, solid state physics, radiation physics, radiation chemistry, geology, radiobiology and other fields.
8. The tremendous rate of industrial growth in the Ukraine calls for even more rapid growth in the energy sector. The average annual increase in the production of electrical energy in the Ukraine, 8-9 per cent, is one of the highest in the world, and total electricity production now exceeds 160 million MW.h.
9. The first unit of a 2000-MW nuclear power station is being built near Chernobyl, and other large stations are planned. Design studies are being carried out for the construction of large nuclear complexes which will supply electric power and also provide water for irrigation in various parts of the Ukraine.
10. A network of isotope laboratories has been set up to distribute sources and instruments of various kinds in series production in the Ukraine and to develop new types of instruments. Thousands of radioisotope instruments are being used for various purposes in Ukrainian industry, making possible improvements in many technological processes.
11. Particular importance is attached to achieving still greater efficiency in agriculture, to increasing yields and to raising the quality of agricultural produce. Radioisotopes and other sources of nuclear radiation are playing an important role in this connection.
12. At the Institute of Plant Physiology of the Academy of Sciences of the Ukrainian SSR, labelled nuclides are being used in plant nutrition and metabolism studies. Important results have been obtained in mutation breeding. For instance, economically valuable wheat and maize mutants, a new variety of early potato resistant to fungous diseases and with an increased starch content, and a high-yield dwarf barley have been obtained.
13. The use of ionizing radiation in medicine has opened up entirely new possibilities of diagnosing and treating many illnesses. Medical radiology research is currently being carried out at 25 institutes and universities in the Ukraine.

14. More than 50 different isotopes and labelled compounds are being used in research and clinical practice, for determining the functional state of various organs and diagnosing various diseases. Ukrainian scientists have developed several new methods of diagnosing and treating diseases of certain organs.

15. The Ukrainian SSR has always encouraged the extension of international collaboration in the peaceful uses of atomic energy. The Ukraine was co-sponsor of a resolution submitted in 1961 by a group of socialist countries concerning the establishment of medical centres and physics laboratories in developing countries and also the award of fellowships to train specialists from such countries. The Ukraine has always supported the Agency's efforts to provide assistance to developing countries and to promote the exchange of scientific and technical information.

16. The research institutes in Kiev have frequently been visited by eminent foreign scientists, by members of the Agency's Secretariat and by specialists from developing countries. Agency fellows have also received training there.

17. Under bilateral agreements concluded by the Soviet Union with a number of socialist and developing countries, the Ukraine is providing those countries with assistance in utilizing atomic energy in their national economies.

18. The main achievements of the Ukraine in nuclear research and the practical application of radioisotopes and nuclear radiation in the national economy have been reported at the four International Conferences on the Peaceful Uses of Atomic Energy held in Geneva and at other international conferences. The results of measurements of nuclear interaction constants performed at the Nuclear Research Institute of the Academy of Sciences of the Ukrainian SSR are regularly transmitted to the Agency and included in the nuclear data publications issued by the Agency. The Ukraine is also participating in the programme of the International Nuclear Information System.

19. Direct contacts have been established between scientific institutions in the Ukraine carrying out nuclear research -- for example, the Institute of Theoretical Physics of the Academy of Sciences of the Ukrainian SSR -- and similar institutions in many foreign countries. Many eminent foreign scientists regularly carry out research at the Institute of Theoretical Physics and, in their turn, Ukrainian

scientists participate in the work of foreign research centres, including the International Centre for Theoretical Physics at Trieste. Results are exchanged with scientific institutions and individual scientists in 40 countries. The Institute organized the 15th International Conference on Plasma Physics, which was held in Kiev in 1971. A regular exchange of trainees and scientific information with foreign centres is being conducted by the Nuclear Research Institute, the Physico-Technical Institute and many other research institutes in the Ukraine.

20. Advances in nuclear science, the expanding use of radioisotopes and nuclear radiation in scientific research and in the national economy, and the construction of large nuclear power stations bear witness to the high level of scientific and technological development in the Ukraine.

