THE CHRONOLOGICAL DEVELOPMENT OF THE RADIATION CENTER AND INSTITUTE OF NUCLEAR SCIENCE AND ENGINEERING

Soon after the beginning of the nuclear era in 1945, the faculty at Oregon State University began developing peaceful uses for nuclear energy in various fields. The use of radioisotopes as a research tool at this institution was begun in 1948 with the development of methodology for the use of labeled compounds in several research programs in physical science and biological science. Isotope exchange reactions were studied by Professors T. H. Norris and J. Huston using sulfur-35 labeled compounds; modes of action of pesticides were studied by Professors J. Butts and S. C. Fang using ^{14}C-labeled DDT and 2,4D; biosynthetic pathways of amino acids were studied by Professors V. H. Cheldelin, B. E. Christensen and C. H. Wang using a number of ^{14}C-labeled compounds.

In the succeeding decade, instruction and research programs in nuclear science and engineering have been implemented in various Schools at a very rapid pace. Chronologically, notable progress during this period can be summarized as follows:

1949: An institutional Radiation Safety Committee was organized

with Professor C. L. Anderson serving as Chairman, to oversee the safety problems relative to the use of ionizing radiation and radioisotopes.

1950: Several courses in nuclear physics and radiochemistry were established in the Department of Physics and the Department of Chemistry respectively.

1953: Two courses in radiotracer methodology were established in the Department of Chemistry.

1955: A 37" cyclotron was constructed by the staff of the Department of Physics under the leadership of Professors L. Schecter and D. B. Nicodemus.

1958: A major grant amounting to $250,000 from the Atomic Energy Commission was awarded to the institution to broaden the scope of the training programs in nuclear engineering and nuclear science under the leadership of Dean G. W. Gleeson. The grant funds were used to procure an AGN-201 training reactor, capable of operating at 1/10 watt steady-power level, and a number of nuclear instruments for the Departments of Mechanical Engineering, Chemical Engineering, Physics and Chemistry.

1959: A graduate program in nuclear engineering was established in the Department of Mechanical Engineering with the initiation of courses in nuclear engineering, reactor analysis,

nuclear processing and nuclear instrumentation. Mr. J. R. Prince was appointed as the Radiation Health Officer.

By 1960, radioisotopes and ionizing radiation were used as research tools by a great number of faculty members in practically every department in the Schools of Agriculture, Engineering and Science. In addition, several major research programs were studying the basic nature of nuclear radiation, effect of radiation upon biological systems, and the use of gamma radiation for food preservation. These developments prompted the University administration to conduct a survey of the need for better facilities to accommodate the anticipated sizable expansion in the forthcoming decade. The results of the survey indicated that approximately 10,000 sq. ft. of laboratory space in 11 departments were used for research related to radioisotopes and nuclear energy. These programs, aided by nuclear instruments amounting to $450,000 in value, were dealing with relatively low levels of radioactivity.

It was the general feeling that it would be advisable to establish a research facility laboratory designed to house major nuclear and radiation facilities that cannot be accommodated by individual departments, and to house programs involving the use of higher levels of radioactivity or radiation. A Committee was organized, charged with the responsibility to plan an institutional facility laboratory. The members of the Committee were:

A. W. Anderson (Radiation Microbiology)

E. A. Daly (Nuclear Engineering)

S. C. Fang (Isotope Technology in Agriculture)

J. G. Knudsen (Heat Exchange)

T. H. Norris (Radiochemistry)

J. E. Oldfield (Animal Nutrition)

L. Schecter (Nuclear Physics)

R. O. Sinnhuber (Food Science)

W. R. Stahl (Radiobiology)

C. H. Wang, Chairman (Radiotracer Chem. & Radiation Chem.)

The Committee formulated major policies relative to the functions and management of the Radiation Center and devised a plan for the development of an institutional laboratory facility calling for the construction of the Radiation Center laboratories and a research reactor facility.

The funding arrangement for the construction of the Radiation Center laboratory was completed in the fall of 1962 upon receipt of an NSF grant of $200,000, a PHS grant of $177,640 and a special appropriation from the State Emergency Board of $377,640. In order to take advantage of design concepts of other major nuclear and radiation laboratories, Mr. R. Adams, Director, Physical Plant; Mr. Wyman Bear, the appointed architect for the building; and C. H. Wang visited a number of U.S. nuclear and radiation installations. Detailed design of the building was soon underway & the construction project

begun in January 1964. The Radiation Center laboratories were completed in June 1964 and were fully occupied by August 1964 with the operation managed by the Director, C. H. Wang.

Housed in the Radiation Center Building are such facilities as the AGN-201 training reactor; a 3,300 curie Co-60 irradiator; a subcritical assembly; a 300 kVp x-ray generator; a 250 kVp x-ray generator; a 4,096 channel analyzer; a 400 channel analyzer; and a number of units of automatic counting equipment, with an estimated value of $400,000. Special laboratory facilities include a large animal facility, aquaria with sea water supply, greenhouse, small animal facility and training facilities, all designed to accommodate research programs involving the use of higher levels of radioisotopes.

Meanwhile, a subcommittee was organized in the fall of 1963 to select the type of reactor most suited for the existing and projected programs and to make plans for associated facilities with Professors E. Daly, T. Norris, L. Schecter and C. Wang serving as members. The subcommittee decided to procure a TRIGA Mark III pulsing reactor for its safety and versatility and for its adaptibility to all potential uses of various programs on the campus. Funding arrangements for the nuclear research reactor facility were completed in May 1965 upon receipt of a grant from the NSF amounting to $300,000; a grant from the AEC covering fuel fabrication cost amounting to $166,400; and a special appropriation of the State Legislative Assembly of 1965 amounting to $387,840.

The design task for the reactor housing project was again assigned to the architectural firm of Bear, McNeil, Schneider, Bloodworth and Hawes and the construction project was begun in September 1965. The reactor housing and associated laboratories were completed on October 15, 1966 and the construction of the research reactor begun on August 16, 1966, upon receipt of a construction permit from the AEC. The research reactor was completed on January 25, 1967 and the reactor achieved criticality on January 30, 1967. The operation of the research reactor in the pulsing mode was tested on January 31, 1967.

The OSU research reactor is licensed to operate at 250 Kw steady power level and 2,000 Mw in the pulsing mode with provisions to raise the steady power level to 1 Mw at a later date. The reactor is fully equipped with various types of irradiation facilities including a Lazy Susan 40-specimen sample rack, a pneumatic sample transfer system, four beam ports, a thermal column and a bulk shielding tank. Associated laboratories in the new reactor housing addition include a 10-curie gamma cell equipped with remote-controlled manipulators, viewing windows, etc.; a fully equipped neutron activiation analysis laboratory and facilities to process radioisotopes, particularly those having short half lives, that can be produced in the reactor.

The addition of the nuclear research reactor facility to the Radiation Center completes the over-all plan for the development of the institutional facility for nuclear science & engineering, a two-million-dollar installation.

The operation of the Radiation Center is under the guidance of a Coordination Board which consists of the following members:

M. Popovich, Dean of Administration (Chairman)

G. W. Gleeson, Dean of Engineering

H. P. Hansen, Dean of Graduate School

R. W. Henderson, Asst. Dir., Ag. Expt. Station

W. H. Slabaugh, Assoc. Dean, Graduate School

J. M. Ward, Dean, School of Science

C. O. Wilson, Dean of Pharmacy

C. H. Wang, Director, Radiation Center (Executive Secretary)

Policies relative to space utilization and other technical matters are the responsibility of an Executive Advisory Committee with Professors L. Schecter(Physical Science, Chairman), H. J. Evans (Biological Science), J. G. Knudsen (Engineering), J. E. Oldfield (Agricultural Science) and C. H. Wang (Secretary), serving as members.

The functions of the Center are:

1. Accommodation of research programs involving the use of higher levels of radioisotopes or neutron sources.

2. Exploratory programs on novel uses of radioisotopes and radiation in research.

3. Consultation in the application of radioisotopes and radiation in research.

4. Safety analysis of radioisotopes and radiation operations.

5. Measurement of various types of ionizing radiation.

6. Accommodation of gamma or x-irradiation experiments.

7. Training programs in nuclear engineering and nuclear science.

At present, the Center is fully staffed to carry out the designated functions and is currently accommodating 21 research programs from various departments. Total research support of these programs and the research programs under the direction of the Radiation Center staff is estimated to be approximately $500,000 annually.

In order to coordinate research efforts and to devise long-range plans in the development of training programs in nuclear science and engineering, the Institute of Nuclear Science and Engineering was established in 1964 and C. H. Wang was appointed as the director. Recent activities of the Institute include the development of instruction and research competency in such areas as nuclear engineering, radiation chemistry, radiation biology and neutron activation analysis; development of plans for an Academic Year Institute Program in nuclear science; a short-course program in radiotracer methodology; and a short-course program in neutron activation analysis.