Californium Loan Programme

The offer of the United States to loan Californium-252 sources to the IAEA was made by Dr. Glenn T. Seaborg, then chairman of the USAEC, in his opening statement at the 15th. General Conference of the IAEA held in Vienna in 1971. The purpose of this loan was to make neutron emitting sources available to universities in the Member States for use in educational programmes. The sources, in the form of small needles designed for medical use in radiation therapy (**Figure 1**)*, were judged highly suitable for didactic applications due to their small size, limited activity and well documentated radiological parameters.*

Subsequently, in May 1973, the Director General announced the availability of the Californium sources to the Member States. To date, numerous sources have been loaned to universities in Czechoslovakia, Costa Rica, the Federal Republic of Germany, Ghana, India, Iran, Israel, Japan, South Africa, Switzerland, the United Kingdom and Uruguay; additional applications for loans are being processed. It is anticipated that the loan programme will be terminated in 1975 once all the available sources have been distributed.

In order to provide guidance for the Member States on the safe exploitation of these sources, a prototype use and storage facility was designed by IAEA staff of the Dosimetry Section of the Division of Life Sciences, and constructed at the IAEA laboratory in Seibersdorf, Austria.

Figures 2-5 *illustrate some of the details of this container, which is being given to the Ghana Nuclear Centre in support of a training programme for students at the university in Accra. Further advice to users of these sources will be provided by the publication of an instructional syllabus, a laboratory manual for experiments and the safety precautions inherent in the proper handling of neutron emitting radionuclides, authored by Professors Erich J. Hall and Harald H. Rossi of Columbia University. The syllabus and manual will be published as part of the IAEA Technical Series in September.*

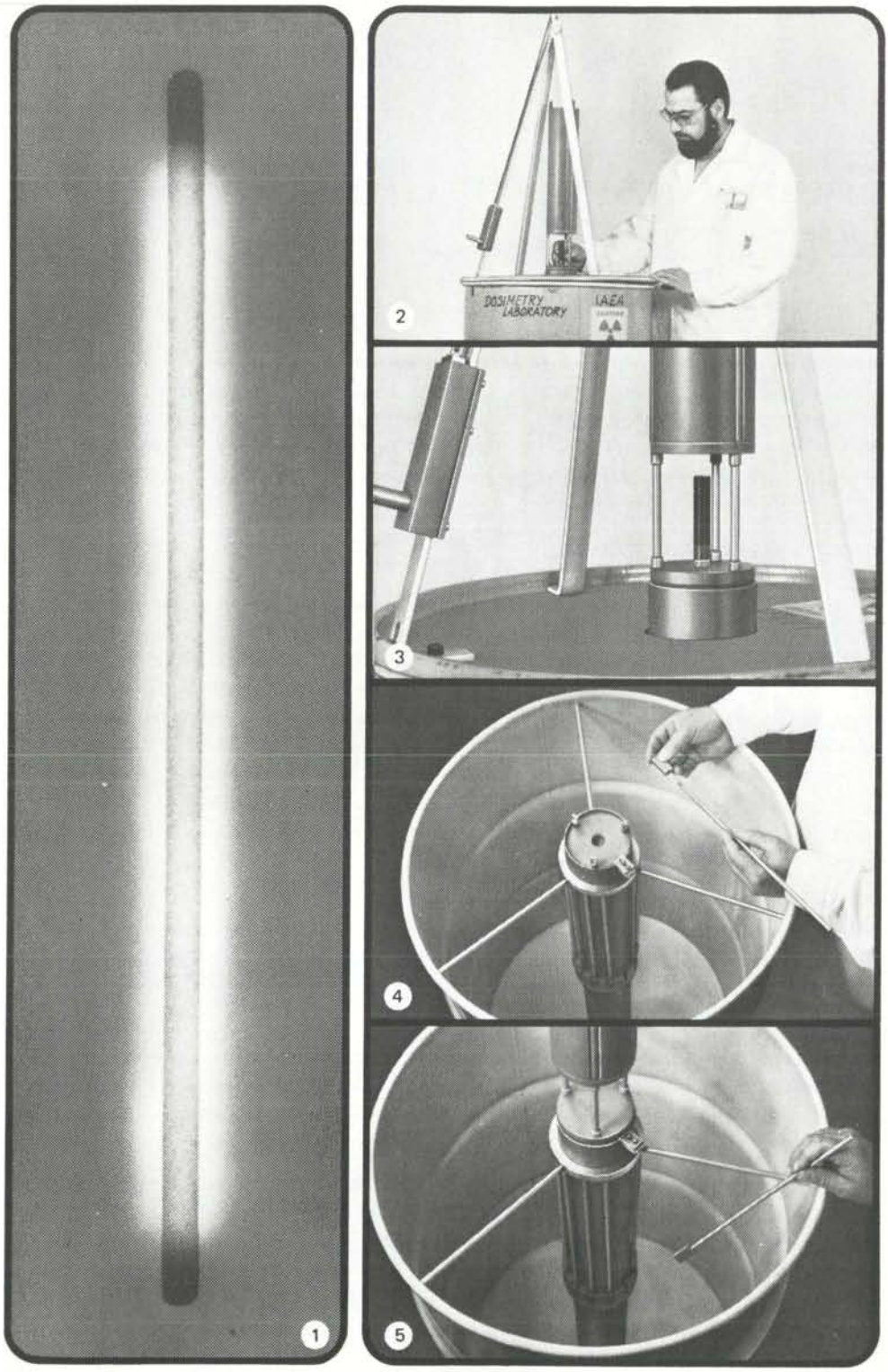
Figure 1: Enlargement of combination x-ray and autoradiograph of ALC source illustrating the distribution of activity relative to the total dimensions of the needle. (Radiograph courtesy of Dr. Madvanath, Bhabha Atomic Research Centre, Bombay, India.)

Figure 2: A member of the Agency's Dosimetry Laboratory inserting a radiation dosimeter into the irradiation chamber of the container. Approximately 10 μg of Cf-252 are employed in the facility which contains 200 litres of borated water to serve as shielding. Movable plastic shields permit access to the irradiation chamber without danger to the workers handling the facility. This container will be presented to the Ghana Nuclear Centre in Accra for use in a university physics instruction programme.

Figure 3: A tissue-equivalent plastic condensor ionization chamber is shown in place in the irradiation chamber. Above and below the chamber are movable plyvinylchloride plugs which shield the radiation workers during the lowering and withdrawal of the assembly into and out of the container.

Figure 4: The top of the container has been removed to illustrate the emplacement of the array of radiation sources around the central irradiation column. The sources, in the form of small needles, are inserted into plastic holders which are manipulated with long plastic rods. Twelve such sources are placed around the circumference of the central column after the container has been filled with borated water (to provide visual clarity, the water is not in the tank).

Figure 5: This close-up photograph illustrates the construction of the source holder and the manipulating rod which is easily dis-assembled (There is no radiation source in the holder in this photograph).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