

**Directory of Whole-Body  
Radioactivity Monitors**

DIRECTORY OF WHOLE-BODY  
RADIOACTIVITY MONITORS

(LOW ACTIVITY LEVELS)

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INTERNATIONAL ATOMIC ENERGY AGENCY  
VIENNA, 1964

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DIRECTORY OF WHOLE-BODY RADIOACTIVITY MONITORS,  
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## FOREWORD

The assessment of radioactive body-burdens in man is a problem to which increasing attention has been devoted in recent years to improve physical surveillance in radiation protection and to perfect certain diagnostic techniques in medical radioisotope work. This development has been facilitated by spectacular advances in instrumentation. Since technical data on whole-body radioactivity monitors and the results of body-burden measurements are scattered throughout the world literature, proceedings of scientific meetings, reports and journal articles, the International Atomic Energy Agency decided that it would be useful to prepare a "Directory of Whole-Body Radioactivity Monitors". This volume is the result of the collection and preparation of data on this subject and comprises a compilation of laboratories operating such facilities, technical data suitable for intercomparison of the design and performance of such apparatus and a bibliography covering the relevant literature.

This Directory was prepared by Dr. J. G. Mehl, Division of Health, Safety and Waste Disposal, and edited by E. R. Beck, Division of Scientific and Technical Information.

The International Atomic Energy Agency intends to follow up this survey by publishing supplementary information on progress in the field. Users are invited to inform the Agency of new installations operating whole-body monitors and of references to literature not covered by the bibliography. Suggestions and other correspondence should be addressed to:

The Director,  
Division of Health, Safety and Waste Disposal,  
International Atomic Energy Agency,  
Vienna I, Kärntner Ring 11, Austria.

### **EDITORIAL NOTE**

***The use in this Directory of particular designations of countries or territories does not imply any judgement by the Agency as to the legal status of such countries or territories, of their authorities and institutions or of the delimitation of their boundaries.***

***The mention of specific companies or of their products or brand-names does not imply any endorsement or recommendation on the part of the International Atomic Energy Agency.***

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### ANNEXES: KEYS TO SYMBOLS

**PART I**

**INTRODUCTION  
GENERAL INFORMATION  
EXPLANATIONS TO DATA SHEETS**

## ACKNOWLEDGEMENT

The technical data in this report were obtained from persons operating whole-body radioactivity monitors or having advanced plans for operating such apparatus. These experts kindly provided the information listed in the data sheets, the illustrations to supplement these data, and collaborated with the Secretariat in the preparation of the bibliography. This study would not have been possible without their co-operation.

It should be noted here that in preparing the data sheets use was made of a report from the Johns Hopkins University\* reviewing the whole-body counters in the United States in 1960.

Gratitude is also expressed to J. Rundo (UKAERE, Harwell) for his advice and help in the initial planning of this work.

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\* MORGAN, R.H., MOXLEY, Y.M. and BATES, L.M., Report on Total Body Counters in the United States and the Feasibility of a Transportable Total Body Counting Spectrometry System, Johns Hopkins University, Baltimore (1960).

## INTRODUCTION

There has in recent years been an increasing demand for direct measurements of total body radioactivity at and below the maximum permissible body burdens. Whole-body radioactivity monitors capable of measuring such low activity levels are costly if they are to be used for radionuclides of high radiotoxicity (and consequently low maximum permissible body burden) or for radionuclides which emit high energy photon radiation with a low yield. A good deal of laboratory space and manpower are needed to operate such apparatus to full advantage. For these reasons it becomes obvious that such facilities cannot be readily available everywhere, even if there were good reasons to perform such measurements at many places.

It was therefore felt to be a useful project to prepare a world list of whole-body radioactivity monitors available for low-activity-level measurements, which could help to promote closer co-operation between the laboratories operating these and the establishments which, though concerned with problems of low-level body-radioactivity measurements, cannot afford to operate such apparatus on their own.

It was believed, furthermore, that a list of technical data in a form suitable for intercomparison of techniques applied, equipment used and sensitivity achieved would be useful to those interested in direct measurements of internal contamination and to those wishing to design and construct apparatus required for such measurements.

Since not all the relevant data are easily available in a form which permits intercomparison, the co-operation of all the laboratories operating whole-body monitors was requested. A data sheet and explanations to the data sheet were prepared, specifying the information required. We wish to thank all those who contributed to this survey and hope that the information received has been interpreted correctly. It is in the nature of such surveys that they can never be complete. All those monitors which were known to be in operation at the end of 1962 have been included. Additional information is included on monitors which were scheduled to have become operational in 1963.

In addition, use has been made of the open literature as far as possible. The bibliography which resulted from the search of publications pertaining to direct measurements of body radioactivity is intended to supplement the information compiled in this Directory.

The results of this survey have been summarized and are classified in a manner described in the following two sections.

## GENERAL INFORMATION

Table I contains the full addresses of Institutes which operate low-level, whole-body radioactivity monitors, classified according to the States where these laboratories are located and reference numbers of the data sheets giving the technical details and diagrams for the individual monitors of each laboratory in the directory. Listing is restricted to those laboratories for which evidence was obtained that the monitors were in operation before the end of 1962. The year in which these monitors became operational is added in order to facilitate the search for publications from the individual laboratories in the bibliography (in Part III) which is classified by years. If no data sheet is included (i. e. if the monitor is no longer operational, or if no data was made available) one or two asterisks are placed against the monitor reference.

Table II contains the full addresses of Institutes which have advanced plans to operate low-level, whole-body radioactivity monitors (i. e. due to become operational after December 1962) classified according to the States where these laboratories are located and the reference numbers of the preliminary data sheets giving the technical details and diagrams for the individual monitors of each laboratory in the directory. If no data sheet is available (i. e. no information has been received) this is indicated by an asterisk in front of the reference.

TABLE I

**LABORATORIES OPERATING LOW-LEVEL,  
WHOLE-BODY RADIOACTIVITY MONITORS, DECEMBER 1962**

State	Institute	Data sheet code	Operating since
Australia	Anti-Cancer Committee of the University of Adelaide, Radiotherapy Dept of the Royal Adelaide Hospital, North Terrace, Adelaide, S. Australia	AL 1.1. AL 1.2.	1959 1961
	Australian Atomic Energy Commission, Health Physics Group, Lucas Heights, New Illawara Road, Sutherland, N. S. W.	AL 2.1.	1962
Austria	International Atomic Energy Agency, Headquarters, Dept of Research and Isotopes, Kärntner Ring 11, Vienna I	AU 1.1.	1962
Belgium	Centre d'Etudes Nucléaires (CEN), Département Mesures et Contrôle des Radiations, Mol Donk	BE 1.1.	1959
Canada	University of Toronto, Dept of Physics, Toronto 5, Ontario	CA 1.1.	1958
	Atomic Energy of Canada Ltd., Medical Research Branch, Chalk River, Ontario	CA 2.1.	1959
	Radiation Protection Division, Dept of National Health and Welfare, Total Body Monitor, Brookfield Road, Ottawa	CA 3.1.	1961

TABLE I (cont.)

State	Institute	Data sheet code	Operating since
Czechoslovak Socialist Republic	Institute of Industrial Hygiene and Occupational Diseases, Dept of Ionizing Radiation, Praha - Vinchradý, Srobarova 48	CS 1.1.	1962
Denmark	Finseninstitutet og Radiumstationen, Finslaboratory, Strandboulevard 49, Copenhagen	* DK 1.1. DK 1.2.	1953-60 1960
Finland	University of Helsinki, Dept of Radiochemistry, Hallituskatu 9, Helsinki	FI 1.1.	1962
France	Commissariat à l'Energie Atomique, CEN Saclay, Electronics Dept, P.O. Box 2, Gif-sur-Yvette, (S. et O.)	FR 1.1.	1958
	Commissariat à l'Energie Atomique, CEN Fontenay-aux-Roses, Dept of Atomic Hygiene and Radiopathology, P.O. Box 6, Fontenay-aux-Roses, (Seine)	FR 2.1. FR 2.2.	1959 1960
	Commissariat à l'Energie Atomique, Centre de Production de Plutonium de Marcoule, Laboratoire de Radiotoxicologie (section médicale), P.O. Box 1, Chusclan, (Gard)	FR 3.1.	1960
	Institut National de Hygiène, Service Central de Protection contre les Radiations Ionisants, 33 Avenue du Général Leclerc, Fontenay-aux-Roses, (Seine)	FR 4.1. FR 4.2.	1961 1962
	Commissariat à l'Energie Atomique, CEN Saclay, Medical Service, P.O. Box 2, Gif-sur-Yvette, (S. et O.)	FR 5.1.	1962

\* No longer in operation; no data sheet given

TABLE I (cont.)

State	Institute	Data sheet code	Operating since
France (cont.)	Commissariat à l'Energie Atomique, CEN Fontenay-aux-Roses, Medical Service, P.O. Box 6, Fontenay-aux-Roses, (Seine)	FR 6.1.	1962
Federal Republic of Germany	U. S. Army Medical Research Unit (Europe), Human Counter Laboratory, Landstuhl (Pfalz), Kirchberg, Bldg. 3809	GY 1.1.	1959
	Max Planck Institut für Biophysik, Low-level Laboratory, Forsthausstrasse 70, Frankfurt/Main	GY 2.1.	1960
	Kernreaktor Bau- u. Betriebs GmbH., Strahlenmessabteilung, Karlsruhe	GY 3.1.	1961
	Freie Universität, Strahleninstitut, Body Radioactivity Measurements Group, Soorstrasse 83, Berlin	GY 4.1.	1961
	Czerny Krankenhaus für Strahlenbehandlung, University of Heidelberg, Heidelberg	GY 5.1.	1962
	University of Hamburg, Dept of Physiological Chemistry, Vitamin Division, Martinistrasse 52, Hamburg 20	GY 6.1.	1962
India	Atomic Energy Establishment Trombay, Health Physics Division, Apollo Pier Road, Bombay	IN 1.1.	1962
Japan	Japan Atomic Energy Research Institute, Health Physics Division, Toaki-mura, Naka-gun, Ibaraki-ken	JA 1.1.	1961

TABLE I (cont.)

State	Institute	Data sheet code	Operating since
Japan (cont.)	National Institute of Radiological Sciences, Division of Radiation Hazards, 250 Kurosuna-cho, Chiba-shi	JA 2.1.	1961
		JA 2.2.	1962
Norway	Norsk Hydro Institute for Cancer Research, Norwegian Radium Hospital, Oslo - Montebello	NO 1.1.	1962
Poland	Institute of Occupational Medicine, Dept of Radiological Protection, Laboratory of Internal Contamination, Lodz, Wodna 40	PO 1.1.	1962
Sweden	Karolinska Sjukhuset, Institute of Radiophysics, Main Laboratory, Stockholm 60	SN 1.1.	1949
		SN 1.2.	1952
		SN 1.3.	
		SN 1.4.	1958
	A. B. Atomenergi, Dept of Radiation Protection and Instrumentation Drottning Kristinas Väg 47	SN 2.1.	1958
		SN 2.2.	1962
	University of Lund, Radiation Physics Dept, Lasarettet, Lund	SN 3.1.	1959
SN 3.2.		1961	
		SN 3.3.	1962
	Gymnastika Centralinstitutet, Physiological Dept, Stockholm	**SN 4.1.	1962
Union of Soviet Socialist Republics	Institute of Radiation Hygiene of the Ministry of Health of the Soviet Socialist Republic, Uliza Mira, Leningrad	SU 1.1.	1961
		SU 1.2.	1961
	Academy of Sciences USSR, Institute of Biochemistry, Moscow	SU 2.1.	1962
Switzerland	Institut du Radium, Centre de Radioactivité Médicale, 44 Bd. de la Cluse, Geneva	SW 1.1.	1962

\*\* No data sheet available

TABLE I (cont.)

State	Institute	Data sheet code	Operating since
United Kingdom	University of Leeds, Dept of Medical Physics, The General Infirmary, Leeds 1, England	*UK 1.1. *UK 1.2. UK 1.3.	1953-58 1958-61 1961
	Atomic Energy Research Establishment, Body Radioactivity Measurements Group, Health Physics and Medical Division, Harwell, Didcot, Berks, England	UK 2.1.	1956
	Radiological Protection Service, Body Radioactivity Measurement Section, Clifton Avenue, Belmont, Sutton, Surrey, England	UK 3.1.	1958
	Atomic Energy Establishment Winfrith, Body Radioactivity Measurements Group, Health Physics Branch, Dorchester, Dorset, England	UK 4.1.	1961
	Atomic Energy Establishment Dounreay, Health and Safety Division, Thurso, Caithness, Scotland	UK 5.1.	1961
	Atomic Energy Establishment, Windscale and Calder Works, Health Physics Dept, Sellafield, Seascale, Cumberland, England	UK 6.1.	1961
	Hammersmith Hospital and Postgraduate Medical School, Dept of Physics and Radioisotope Unit, Ducane Road, Shepherds Bush, London. W. 12. England	UK 7.1.	1961

\* No longer in operation; no data sheet given

TABLE I (cont.)

State	Institute	Data sheet code	Operating since
United Kingdom (cont.)	Institute of Cancer Research, Royal Cancer Hospital and Royal Marsden Hospital, Physics Dept, Fulham Road, London, S.W.3. England	UK 8.1.	1961
United States of America	Argonne National Laboratory, Radiological Physics Division, 9700 South Cass Avenue, Argonne, Ill.	*US 1.1. US 1.2. US 1.3.	1950-54 1954 1957
	University of California, Los Alamos Scientific Laboratory, P.O. Box 1663, Los Alamos, N. Mex.	*US 2.1. US 2.2. US 2.3.	1955-62 1957 1961
	Boston Veterans Administration Hospital, Radioisotope and Medical Service, 150 S. Huntington Avenue, Boston, Mass.	US 3.1.	1957
	University of Utah, College of Medicine, Radiobiology Laboratory, Salt Lake City, Utah	US 4.1.	1957
	Brookhaven National Laboratory, Medical Dept, Medical Physics Division, Upton, Long Island, N.Y.	US 5.1. US 5.2.	1957 1957
	Massachusetts Institute of Technology, Dept of Physics, Radioactivity Center, Cambridge 39, Mass.	US 6.1.	1958
	Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Dept of Biophysics, Washington 12, D.C.	US 7.1. US 7.2.	1958 1958

\* No longer in operation; no data sheet given

TABLE I (cont.)

State	Institute	Data sheet code	Operating since
United States of America (cont.)	Union Carbide Nuclear Company, Y-12 Plant, Radiation Safety Dept, P.O. Box Y, Oak Ridge, Tenn.	US 8.1.	1958
	General Electric Company, Hanford Laboratories, Richland, Wash.	US 9.1.	1959
		US 9.2.	1961
	University of Rochester, Atomic Energy Project, Rochester 20, N. Y.	US 10.1.	1959
	University of California, School of Medicine, Dept of Biophysics and Nuclear Medicine, 900 Veteran Avenue, Los Angeles 24, Calif.	US 11.1.	1959
	Vanderbilt University and Hospital, Radioisotope Center, Nashville 5, Tenn.	US 12.1.	1959
	Veterans Administration Center, Human Radiation Counting Laboratory, Wilshire and Sawtelle Boulevards, Los Angeles 25, Calif.	US 13.1.	1960
	New York University, Bellevue Medical Center, Institute of Industrial Medicine, 550 First Avenue, New York 16, N. Y.	US 14.1.	1960
	Oak Ridge National Laboratory, Health Physics Division, P.O. Box X, Oak Ridge, Tenn.	US 15.1.	1960
	United States Atomic Energy Commission, Analysis Branch, Box 2108, Idaho Falls, Idaho	US 16.1.	1960