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COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF HEALTH

PROCUREMENT AND DISTRIBUTION OF RADIO-ISOTOPES IN AUSTRALIA.

Since 1946, when artificially produced radio-isotopes first became regularly available from overseas sources of supply, the Commonwealth Department of Health has, through its Commonwealth X-ray and Radium Laboratory, provided a central procurement service for those wishing to use radio-isotopes for any purpose in Australia. The Department of Health through its Laboratory has, in exercising the control vested in it through Item 23 in the Third Schedule of the Customs (Prohibited Imports) Regulations, maintained a supervision of the safe and useful application of these radio-isotopes. In addition the Laboratory has, over this period, provided technical assistance and advice in the various fields of application of radio-isotopes.

Now that the Australian Atomic Energy Commission is in a position to prepare, in its own reactor, some of the radio-isotopes required for various purposes in Australia and consequent to the establishment some years ago by the Commission of an advisory service in the use of radio-isotopes in industry and research, the Department of Health and the Australian Atomic Energy Commission have agreed on a redistribution of the activities previously carried by the Department of Health. For the information of users and potential users of radio-isotopes in Australia the procurement and advisory services which will be provided by the Commonwealth Department of Health and the Australian Atomic Energy Commission are set out below in various categories.

1. Procurement

(a) *Radio-Isotopes for Use on Humans.* The Commonwealth Department of Health, through its Commonwealth X-ray and Radium Laboratory, will continue the service it has provided in this field. The Laboratory will continue to obtain bulk supplies of the long-lived radio-isotopes from overseas or from the Australian Atomic Energy Commission and will dispense and distribute individual patient doses. Short-lived radio-isotopes for use on humans within the production capacity of the Commission will, if it is more appropriate, be ordered by the Laboratory for direct despatch to the user from the Australian Atomic Energy Commission.

Applications for radio-isotopes for use on humans should be forwarded, as in the past, to the Chairman of the Therapeutic Trials Committee in the respective State for consideration and transmission to the Commonwealth X-ray and Radium Laboratory. The various State Therapeutic Trials Committees are responsible to the Standing Committee on Radio-Isotopes of the National Health and Medical Research Council which is finally responsible for approving an application. The address of the Standing Committee on Radio-Isotopes is C/o. Commonwealth X-ray and Radium Laboratory, 30 Lonsdale Street, Melbourne, C.1.

The procedure to be followed by users of radio-isotopes on humans is unchanged from that which has applied over a number of years.

(b) *Radio-Isotopes for Medical Research by the Medical Profession, Hospitals, Medical Departments of Universities and Other Organizations.* Applications and orders for radio-isotopes for medical research (i.e. research the results of which may ultimately be applied to human beings) should be forwarded, as at present, to the Director, Commonwealth X-ray and Radium Laboratory, 30 Lonsdale Street, Melbourne, C.1. The Laboratory will either procure and arrange delivery of the material if it is to be imported or authorize supply by, and place an order for supply on, the Australian Atomic Energy Commission. In the latter case the Australian Atomic Energy Commission will arrange despatch direct to the user against the order of the Commonwealth X-ray and Radium Laboratory.

As in the past the Commonwealth X-ray and Radium Laboratory will forward an account to the user against the official order it receives.

(c) *Radio-Isotopes for Non-Medical Research and for Commercial and Industrial Purposes.* Applications and orders for radio-isotopes for non-medical research and for commercial and industrial purposes should be forwarded to The Director, Australian Atomic Energy Commission, Research Establishment (Attention Isotopes Section), Private Mail Bag, Sutherland, N.S.W. The Commission will undertake the production and direct despatch or procurement from overseas and delivery. The Commission will forward an account to the user against the official order for supply.

2. Advisory Services

The Commonwealth X-ray and Radium Laboratory and the Australian Atomic Energy Commission will provide an advisory service on the availability, possible application and safe use of radio-isotopes in their respective fields as outlined above.

3. Customs (Prohibited Imports) Regulations

The Commonwealth Department of Health through its Commonwealth X-ray and Radium Laboratory will continue, by authority under the Customs (Prohibited Imports) Regulations, to authorize entry of radio-isotopes imported in categories 1(a) and (b) above. For importations under category 1(c), the Australian Atomic Energy Commission will issue the necessary authorization under the Customs (Prohibited Imports) Regulations provided that the Commonwealth Department of Health raises no objection.

Importers of equipment incorporating radioactive sources are reminded that they must also observe the provisions of this agreement insofar as the radioactive sources are concerned.

How about combined usage of safety

4. Operation of New Procedures

The new procedures will operate as from 1st July, 1961. However, to avoid any confusion or disruption of service, the Commonwealth X-ray and Radium Laboratory will undertake the procurement and delivery of applications and orders in category 1(c) above received prior to that date.

5. Radioactive Substances Acts and Regulations

The attention of users and potential users of radio-isotopes is directed to the Radioactive Substances Acts and Regulations of the various States administered by the Health Departments of those States.

D. J. STEVENS,
Director.

Commonwealth X-ray and Radium Laboratory,
30 Lonsdale Street,
Melbourne, C.1, Victoria

26th May, 1961.

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thru by Mr. Paul Ridout

Sterilization PTY, Lmtd

iary of Minster, Lmtd

e mostly from sterilizing goat hair

same from Sutures

Syringes experimentally

Pharmaceutical

Antistaphlicocus lotion

Anti-Staph Lotion

air - minimum dose 2 megarad

- size 2'6" (depth of irradiation)

density about .50

length 4'6"

- one bale goes thru 38 hrs

" " out every 58 min

- 4 passes on each side

- 39 bales in irradiator

- 52 " " all

- tonnage 1/4 ton/hr

- dose spread factor of 2

- 600,000 C 4 ft × 10 ft

sources tubes { 2 ft long, 1½ tube

3/8" rod 6" long 24 to each 2 ft tube

curies/tube 3-6,000 C each

st 1-2 C/g 3 to 4 C/g highest

have anthrax vaccine for all workers

still required by law to sterilize

hair from USSR & China & India

hair full of spores.

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SUPPLIERS OF INDUSTRIAL NUCLEONIC EQUIPMENT IN AUSTRALIA

Australian Agent	Overseas Principal	Range of equipment
1. Siemens Henley Pty Ltd., 43 Whiting Street, ARTARMON. N.S.W.	Ekco, U K. Dynatron, U.K.	Various transmission and backscatter thickness gauges, density gauges, moisture gauges, level indicators. Counting equipment.
2. Austronic Engineering Pty. Ltd., 62 Queensberry Street, CARLTON. VIC.	Isotope Development Ltd., U.K.	Thickness gauges, density gauges, level indicators, package monitors. Counting equipment.
3. George Sample and Son Pty. Ltd., 280 Castlereagh Street, SYDNEY. N.S.W.	Baldwin Instrument Co., U.K.	Transmission and backscatter thickness gauges.
4. G.R.D. Instruments, 6 Railway Walk, CAMBERWELL. VIC.	Frieseke and Hoepfner, Germany.	Transmission and backscatter thickness gauges, density gauges. Counting equipment.
5. Long Industrial Equipments Pty. Ltd., 201a George Street, SYDNEY	Local agents for Austronics (I.D.L.) Nuclear Enterprises U.K. and Canada	Thickness gauges, density gauges, level indicators, package monitors, Counting equipment. Airborne survey instruments, gamma logging, soil density and moisture gauges, berylometer and radiographic equipment, counting equipment.
6. Watson Victor Ltd., 9-13 Bligh Street, SYDNEY. N.S.W.	1. Labgear, U.K. 2. Landis and Gyr, Swiss. 3. Rich. Seifert, German.	Thickness gauges, fluid density gauges, level indicators, radiographic equipment, counting equipment.
7. Richard Foot (Aust.) Pty. Ltd., 89 Elizabeth Street, SYDNEY. N.S.W.	E.R.D., U.K.	Radiographic equipment.

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PROGRAM

Dr. Paul C. Aebersold
Mr. E. Beauchamp
Dr. Paul Y. Feng

Visit to Melbourne, Victoria, Australia.

Day and Date	Time	Place	Remarks
Thursday, 7th Sept.	11.30 a.m.	Essendon Airport	Party to be met by Mr. J. F. Richardson, Acting Director, C.X.R.L.
	12.10 p.m.	C.X.R.L., 30 Lonsdale St.	General discussion.
	1.00 p.m.	Lunch	To be arranged by Mr. Richardson. Mr. T. N. Swindon, Senior Physicist, to be invited also.
	1.50 p.m.	Leave C.X.R.L. for Dandenong.	-
	2.30 p.m.	Gamma Sterilization, Pty. Ltd., Dandenong. (Mr. Murray, Mr. Ridout) *	To see 600,000 curie cobalt-60 installation.
	4.30 p.m.	Return to Melbourne.	-
	Evening	Free	-
Friday, 8th Sept.	10.00 a.m.	Leave Savoy-Plaza Hotel	
	10.10 a.m.	Arrive C.X.R.L. in University Grounds (Mr. T.N. Swindon).	To see Radium/Radon Laboratory and X-ray Standards Laboratory.
	11.00 a.m.	Leave C.X.R.L.	
	11.15 a.m.	Arrive Peter MacCallum Clinic (Mr. K.H. Clarke).	Tour of inspection.
	12.45 p.m.	Leave Peter MacCallum Clinic.	-
	1.00 p.m.	Lunch	* Dr. W.P. Holman, Medical Director, Cancer Institute, to be invited also.
	2.00 p.m.	C.X.R.L., 30 Lonsdale St.	Meeting. Dr. Aebersold to speak on "Recent Developments in Medical Applications of Isotopes" (Chairman: Dr. W. P. Holman) to be followed by questions and discussion.
	4.15 p.m.	C.X.R.L., 30 Lonsdale St.	Afternoon tea. Tour of C.X.R.L.
	5.10 p.m.	Leave C.X.R.L. for Essendon Airport.	-
	6.10 p.m.	Leave for Sydney (ANA Flight 320)	-

All transport necessary for the above program will be arranged in advance.

* Miss Mollie Holman
Neurophysiologist Nov early

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Australian Agent	Overseas Principal	Range of equipment
8. A.E.I. Pty. Ltd., 93-95 Clarence Street, SYDNEY. N.S.W.	Nuclear Engineering (Pantatron), U.K.	Radiographic equipment
9. Amalgamated Wireless (A/asia) Ltd., 47 York Street, SYDNEY. N.S.W.	Nuclear Engineering (Pantatron), U.K.	Radiographic equipment
10. A.A. Guthrie Pty. Ltd., 16 Meeks Road, MARRICKVILLE. N.S.W.	1. Bar-ray Products Inc., U.S.A. 2. Tracerlab Inc., U.S.A. 3. Budd Co., U.S.A. 4. Nuclear Corp. of America and others	Thickness gauges, level indicators, density gauges, radiographic equipment, counting equipment.
11. Foxall Instruments, 23 Smith Street, CHATSWOOD. N.S.W.	Ohmart Corporation, U.S.A.	Thickness gauges, density gauges, level indicators
12. Rockley Machinery Co. Pty. Ltd., 642 Harris Street, ULTIMO. N.S.W.	Panax, U.K.	Soil density gauges, counting equipment.
13. Solus X-Ray Company, 201 Macquarie Street, SYDNEY. N.S.W.	Prof. Berthold Laboratories, Germany.	Thickness gauges, level indicators, density gauges, counting equipment, radiographic equipment.
14. Elliott Automation (Fisher Divn.), 22-24 Tooronga Terrace, BEVERLY HILLS. N.S.W.	1. Isotope Developments Ltd., U.K. 2. Elliott Nucleonics.	Thickness gauges, density gauges, level indicators, package monitors, counting equipment.

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This is used as an interim catalogue

AUSTRALIAN ATOMIC ENERGY COMMISSION

RADIO-ISOTOPE PRODUCTION

INTRODUCTION

Radio-isotopes are produced in the A.A.E.C. reactor HIFAR at Lucas Heights near Sydney, N.S.W. Available effective fluxes for radio-isotope production range up to 10^{14}n cm^{-2} sec^{-1}.

Present production includes most unprocessed sources and irradiations to order. Radio-isotopes can also be supplied processed on request and standardizations are undertaken if required.

High specific activity teletherapy cobalt-60, industrial radiography sources and other special medical and industrial sources are also produced.

Charges for irradiations depend on flux and times. These charges and the prices of special sources are available on request.

The table below gives details of available products.

Isotope	Description Chemical form	Unit Weight Size	Specific and total activity	Remarks
Sb-122	Sb Sb_2O_3	2.5 g 3.0 g	5.2 c/g Sb 5.2 c/g Sb	
Sb-124	Sb Sb_2O_3	2.5 g 3.0 g	700 mc/g Sb 700 mc/g Sb	
Sb-125	Sn target	5.0 g	530 µc/g Sn	
As-76	As_2O_3	3.0 g	9.2 c/g As	
As-77	GeO_2 target	3.0 g	27 mc/g Ge	
Ba-131	$BaCO_3$	7.5 g	2.6 mc/g Ba	
Ba-133	$BaCO_3$	7.5 g	42 µc/g Ba	
Ba-139	$BaCO_3$	7.5 g	430 mc/g Ba	
Br-82	KBr	2.0 g	3.4 c/g Br	
Cd-115 & 115m	Cd	0.1 g	34 mc Cd-115m + 470mc Cd-115/g Cd	

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Isotope	Description Chemical Form	Unit Weight Size	Specific and Total Activity	Remarks
Cs-131	$BaCO_3$ target	7.5 g	2.6 mc/g target	
Cs-134	Cs_2CO_3	1 g	1.3 c/g Cs	
Ca-45	$Ca(NO_3)_2$	10 g	10 mc/g Ca	
	$CaCO_3$	10 g	10 mc/g Ca	
Ca-47	$CaCO_3$ enriched	-	Varies with degree of enrichment	
Cl-36	KCl	2 g	37 μc/g Cl	
Cl-38	KCl	2 g	630 mc/g Cl	
Cr-51	Cr	2 g	1.2 c/g Cr	
	Cr_2O_3	4 g	1.2 c/g Cr	
Co-58	Ni	1.5 g	8 mc/g Ni	
Co-60				
Unprocessed				
	Co wire, pellets, etc.	2 g	1.7 c/g Co	Higher specific activities available on request.
	Co_2O_3	3 g	1.7 c/g Co	
Processed				
	$CoCl_2$ in NH_4Cl $Co(NO_3)$ in 3N HNO_3		To specification	
Radiography, Teletherapy and Related Sources				
	Cylinder in Al-alloy capsule	1x1 mm	Up to 300 mc/source	Higher activities available on request
		2x2 mm	Up to 2 c/source	
		4x4 mm	Up to 12 c/source	
	Rod in Al-capsule	4mm dia. x 100mm	To specification	
	Rod in stainless steel capsule	3/8" dia. x 6"	Up to 2000 curies or to specification	
	Teletherapy sources, encapsulated discs (1mm and 2.5mm thick)	12mm dia. 17mm dia.	Max. specific activity available late 1961 - 75c/g Co. Higher specific activities in 1962.	
Medical Sources				
	Wire, foil	On application		

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Isotope	Description Chemical Form	Unit Weight Size	Specific and Total Activity	Remarks
Cu-64	Cu	2 g	6.9 c/g Cu	
	CuO	5 g	6.9 c/g Cu	
	$CuSO_4$	5 g	6.9 c/g Cu	
Ga-70	Ga_2O_3	350 mg	2 c/g Ga	
Ga-72	Ga_2O_3	350 mg	3.2 c/g Ga	
Ge-71	Ge_2O_3	2 g	1.4 c/g Ge	
Au-198 Unprocessed				
	Au	1 g	81 c/g Au	
Processed				
	$AuCl_3$ in soln.		To specification	
	Colloidal gold in sterile soln.		To specification	
Medical Sources				
	Gold grains in 0.5mm Pt coating in Al magazine holding 15 grains		To specification	
Au-199	Pt target	0.5 g	240 mc/g Pt	
In-114m - 114	In	0.5 g	2 c/g In	
In-116m	In	0.5 g	210 c/g In	
I-131 Unprocessed				
	Te target	3 g	79 mc/g Te	
Processed				
	Various		To specification	
Ir-192 Unprocessed				
	Ir	0.135 g	150 c/g Ir	
Radiographic Sources				
	Cylinder in Al-capsule	1x1 mm 2x2 mm 4x4 mm	*Up to 2c/source *Up to 6c/source *Up to 20c/source	Higher activities available on request

* much higher activities now available.

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Isotope	Description Chemical Form	Unit Weight Size	Specific and Total Activity	Remarks
Ir-194	Ir	0.135 g	35 c/g Ir	
Fe-55	Fe	0.7 g	11 mc/g Fe	
	Fe_2O_3	1.0 g	11 mc/g Fe	
Fe-59	Fe	0.7 g	4.6 mc/g Fe	
	Fe_2O_3	1.0 g	4.6 mc/g Fe	
Mg-28	Li-Mg alloy target		Various processed forms & specific or total activities to specifications	
Mn-56	$MnSO_4$	1.0 g	39 c/g Mn	
Mo-99	Mo	6.8 g	52 mc/g Mo	
	MoO_3	10 g	52 mc/g Mo	
Ni-63	Ni	1.0 g	1.5 mc/g Ni	
Ni-65	Ni	1.0 g	83 mc/g Ni	
Pd-103	Pd	1.0 g	7 c/g Pd	
Pd-109	Pd	1.0 g	4.9 c/g Pd	
P-32				
Unprocessed				
	KH_2PO_4	7.5 g	1 c/g P	
Processed				
			To specification	
Pt-197	Pt	0.5 g	230 mc/g Pt	
K-42				
Unprocessed				
	K_2CO_3	4 g	200 mc/g K	
Processed				
	KCl in isotonic solution		150 mc/g K	
Rb-86	Rb_2CO_3 or RbCl	2.5 g	1.3 c/g Rb	
Sc-46	Sc_2O_3	0.5 g	26 c/g Sc	
Se-75	SeO_2	1 g	120 mc/g Se	
Si-31	SiO_2	10 g	19 mc/g Si	

Isotope	Description Chemical Form	Unit Weight Size	Specific and Total Activity	Remarks
Ag-110m	Ag	0.2 g	700 mc/g Ag	
	$AgNO_3$	0.3 g	700 mc/g Ag	
Ag-111	Pd target	1.0 g	450 mc/g Pd	
Na-24 Unprocessed				
	Na_2CO_3	6 g	2.9 c/g Na	
Processed				
	NaCl in isotonic solution		Up to 2.2 c/g Na	
Sr-89	$SrCO_3$	10 g	4.4 mc/g Sr	
S-35 Unprocessed				
	KCl target	4 g	300 mc/g Cl	
Processed				
		To specification		
Ta-182 Unprocessed				
	Ta	2 g	10 c/g Ta	
Medical Radiation Sources				
	0.5 mm and 1 mm dia. wire, bare 0.4 mm and 0.6 mm dia. wire, Pt-sheathed		To specification	
Tc-99	MoO_3 target	10 g	25 mμc/g target	
Tl-204	$TlNO_3$	10 g	40 mc/g Tl	
Tm-170 Unprocessed				
	Tm_2O_3	1 g	25 c/g Tm	
Radiographic Sources				
	Details on request			
Sn-113	Sn	10 g	4.2 c/g Sn	
W-185	W	1.2 g	800 mc/g W	
	WO_3	1.5 g	800 mc/g W	

Isotope	Description Chemical Form	Unit Weight Size	Specific and Total Activity	Remarks
Y-90				
Unprocessed				
	Y_2O_3	10 g	2.3 c/g Y	
Medical Radiation Sources				
	Sintered Y_2O_3 rods for beta therapy	To specification		
Zn-65	Zn	4g	100 mc/g Zn	
	$ZnSO_4$	10 g	100 mc/g Zn	
Zn-69m-69	Zn	4 g	(46 mc Zn-69m and	
	$ZnSO_4$	10 g	(460 mc Zn-69/g Zn	