

March 1999

**Ionising Radiations Metrology Forum
Catalogue of Calibration and Measurement Services
Available in the United Kingdom for the Calibration
and Testing of Radiation Protection Instrumentation**

V E Lewis

IRMF Secretariat
Centre for Ionising Radiation Metrology
National Physical Laboratory, Teddington, Middlesex

ABSTRACT

The Ionising Radiations Metrology Forum maintains a catalogue of the calibration and measurement facilities providing the calibration and testing of radiation protection instrumentation. This consists essentially of a collation of forms sent in to the IRMF Secretariat by over twenty facilities. The 1998 entries are reproduced here along with the introductory pages.

An electronic version of the Catalogue is maintained on the NPL Website of the Internet at: <http://www.npl.co.uk/npl/clubs/irmf>.

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**National Physical Laboratory
Teddington, Middlesex, United Kingdom, TW11 0LW**

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**Approved on behalf of Managing Director, NPL, by
Dr Julian Hunt, Head, Centre for Ionising Radiation Metrology**

CONTENTS

	Page(s)
TITLE PAGES	F - 01 to F - 02
INTRODUCTION	I - 01
HOW TO USE THE CATALOGUE	
LIST OF LABORATORIES AND CODES	
CONTENTS LIST	C - 01 to C - 04
INDEX OF CALIBRATION AND MEASUREMENT SERVICES	IN - 01 to IN - 07
CALIBRATION AND MEASUREMENT SERVICES OFFERED BY PRIMARY STANDARDS LABORATORIES	P1 to PM - 14
CALIBRATION AND MEASUREMENT SERVICES OFFERED BY UKAS-ACCREDITED LABORATORIES	N1 to NX - 04
CALIBRATION AND MEASUREMENT SERVICES OFFERED BY OTHER LABORATORIES	L1 to LZ - 02

**CATALOGUE OF CALIBRATION AND MEASUREMENT
SERVICES AVAILABLE IN THE UNITED KINGDOM
FOR THE CALIBRATION AND TESTING OF
RADIATION PROTECTION INSTRUMENTATION**

Collated on behalf of the
IONISING RADIATIONS METROLOGY FORUM
by the
NATIONAL PHYSICAL LABORATORY
Teddington
Middlesex, TW11 0LW

**CATALOGUE OF CALIBRATION AND MEASUREMENT SERVICES
AVAILABLE IN THE UNITED KINGDOM FOR THE CALIBRATION
AND TESTING OF RADIATION PROTECTION INSTRUMENTATION**

INTRODUCTION

Membership of the Ionising Radiations Metrology Forum - IRMF extends to representatives of UK establishments and organisations actively involved in calibrations or measurements in the field of ionising radiations and radioactivity and those organisations concerned with the manufacture of relevant instruments and artifacts. The IRMF is managed by NPL according to rules adopted by common consent; NPL provides the chairman and the secretariat.

The IRMF was established in 1990 with the aim of facilitating the exchange of information about available UK calibration and testing facilities and their efficient use in the furtherance of compliance with the requirements of current ionising radiations regulations and codes of practice. The IRMF seeks also to represent members' interests in dealing with other, appropriate expert bodies, including those responsible for regulations and for measurement protocols.

In pursuance of the first of its stated aims, above, the IRMF has sought to identify those institutions in the UK which provide calibration and testing services in the field of ionising radiations and radioactivity, to obtain information about those services and to bring this information together in one place.

In view of the growing recognition of the importance of traceability to national standards to measurement quality assurance, the entries in this catalogue are presented in three categories. The first includes services offered by NPL as the UK Primary Standards Laboratory: these services are subject to NPL's in-house quality system and are automatically traceable, being provided in many cases using the same equipment which is used for primary measurements. The second category includes those services for which the parent laboratories have been successful in achieving accreditation under UKAS, the United Kingdom Accreditation Service: these services are again traceable to national standards and are subject to rigorous in-house quality systems. The third category comprises other services, for which traceability is either lacking as yet, or provided on a less formal basis.

HOW TO USE THE CATALOGUE

To aid the user in locating services of interest, each entry (service) is provided with a unique identifier which serves also as a page number. This identifier takes the form

YZ - XX

where

Y is a letter identifying the category of each laboratory and can be

P for Primary Standards Laboratory,

N for UKAS-Accredited Laboratory,

L for Laboratory (other);

Z is a letter identifying each laboratory as per the list given on the next page;

XX is a page number for each entry for the laboratory in question.

An index is provided which lists entries according to the nature of the service offered. As an example, if the reader is looking for a UKAS-accredited laboratory providing calibrations based upon ^{241}Am gamma-rays she/he will be directed, on page IN-01 of the index, under **Gamma-rays - radionuclide sources** - ^{241}Am radionuclide gamma-ray source, to the entry for AEA Technology (Winfrith), located on page NB-01 (UKAS-Accredited Laboratories) of the catalogue.

NOTES

It is anticipated that this catalogue will be updated on a regular basis and according to need by the issue of additional or amended individual entries together with a revised index and list of laboratories. When a change occurs involving the transfer of a service between sections, eg from Section 3 (Y given by L) to section 2 (Y given by N) following UKAS accreditation, an entry sheet and the corresponding index reference will simply disappear from one place and appear in another.

Contents of the entries contained in this catalogue are indicative of the services offered and are subject to change. Comments and enquiries regarding any individual entry should be addressed in the first place to the responsible laboratory at the address given.

Enquiries and comments of a general nature will be welcomed by those named below at NPL.

Julian Hunt and Vic Lewis
IRMF Secretariat
Centre for Ionising Radiation Metrology
National Physical Laboratory

LIST OF LABORATORIES AND CODES

(Issue 7 - April 1998)

This catalogue contains information received from the following organisations, institutions or laboratories, with their identifying alphabetic codes used in this catalogue:

AEA Technology (Harwell)	A
AEA Technology (Winfrith)	B
AEA Technology (Harwell Instruments)	C
Johnson Controls Ltd, Dounreay	D
Amersham International plc	E
Bristol General Hospital	F
British Nuclear Fuels plc (Sellafield)	G
Defence Radiological Standards Centre (DRaStaC)	H
Royal Naval College, Greenwich	I
National Physical Laboratory	M
National Radiological Protection Board (Chilton)	N
National Radiological Protection Board (Scottish)	O
National Radiological Protection Board (Northern)	P
National Radiological Protection Board (Southern)	Q
NE Technology Ltd	R
Magnox Electric plc, Berkeley	S
Radiation Protection Service, University of Leeds	T
Regional Radiation Physics & Protection Service, Birmingham	U
Radiation Protection Service, Velindre Hospital, Cardiff	V
St George's Hospital, London	W
DERA Radiological Protection Service (Institute of Naval Medicine)	X
Northern Ireland Radiation Protection Service, Belfast	Y
Guy's & St Thomas' Hospital Trust, London	Z

CONTENTS LIST

Title pages

IRMF 1998 (Issue 7)	F - 01
IRMF 1998 (Issue 7)	F - 02

Introduction

IRMF 1998 (Issue 7)	I - 01
IRMF 1998 (Issue 7)	I - 02
IRMF 1998 (Issue 7)	I - 03

Contents

IRMF 1998 (Issue 7)	C - 01
IRMF 1998 (Issue 7)	C - 02
IRMF 1998 (Issue 7)	C - 03
IRMF 1998 (Issue 7)	C - 04

Index

IRMF 1998 (Issue 7)	IN - 01
IRMF 1998 (Issue 7)	IN - 02
IRMF 1998 (Issue 7)	IN - 03
IRMF 1998 (Issue 7)	IN - 04
IRMF 1998 (Issue 7)	IN - 05
IRMF 1998 (Issue 7)	IN - 06
IRMF 1998 (Issue 7)	IN - 07

Section 1: Primary Standards Laboratories

M - 1

National Physical Laboratory

PM

+	IRMF 1998 (Issue 7)	PM - 01
+	IRMF 1998 (Issue 7)	PM - 02
+	IRMF 1998 (Issue 7)	PM - 03
+	IRMF 1998 (Issue 7)	PM - 04
+	IRMF 1998 (Issue 7)	PM - 05
+	IRMF 1998 (Issue 7)	PM - 06
+	IRMF 1998 (Issue 7)	PM - 07
+	IRMF 1998 (Issue 7)	PM - 08
+	IRMF 1998 (Issue 7)	PM - 09
+	IRMF 1998 (Issue 7)	PM - 10
	IRMF 1998 (Issue 7)	PM - 11
	IRMF 1998 (Issue 7)	PM - 12
+	IRMF 1998 (Issue 7)	PM - 13
+	IRMF 1998 (Issue 7)	PM - 14
+	IRMF 1998 (Issue 7)	PM - 15
+	Also UKAS-accredited	

Section 2: UKAS-Accredited Laboratories	N - 1
AEA Technology (Winfrith	B
IRMF 1998 (Issue 7)	NB - 01
Johnson Controls Ltd, Dounreay	D
IRMF 1998 (Issue 7)	ND - 01
Nycomed Amersham plc	E
IRMF 1998 (Issue 7)	NE - 01
IRMF 1998 (Issue 7)	NE - 02
IRMF 1998 (Issue 7)	NE - 03
IRMF 1998 (Issue 7)	NE - 04
Defence Radiological Standards Centre (DRaStaC)	H
++ IRMF 1998 (Issue 7)	NH - 01
IRMF 1998 (Issue 7)	NH - 02
IRMF 1998 (Issue 7)	NH - 03
IRMF 1998 (Issue 7)	NH - 04
IRMF 1998 (Issue 7)	NH - 05
IRMF 1998 (Issue 7)	NH - 06
IRMF 1998 (Issue 7)	NH - 07
++ Primary standards held	
Magnox Electric	S
IRMF 1998 (Issue 7)	NS - 01
DERA Radiological Protection Service	X
IRMF 1998 (Issue 7)	NX - 01
IRMF 1998 (Issue 7)	NX - 02
IRMF 1998 (Issue 7)	NX - 03
IRMF 1998 (Issue 7)	NX - 04

Section 3: Other Laboratories

L - 1

AEA Technology - Environment & Energy (Harwell)

A

* IRMF 1992 (Issue 1)	LA - 01
* IRMF 1992 (Issue 1)	LA - 02
* IRMF 1992 (Issue 1)	LA - 03
* IRMF 1992 (Issue 1)	LA - 04
* IRMF 1992 (Issue 1)	LA - 05
* IRMF 1992 (Issue 1)	LA - 06
* IRMF 1992 (Issue 1)	LA - 07
* IRMF 1992 (Issue 1)	LA - 08

* Not updated; paper copies only

AEA Technology - Instruments (Harwell)

C

IRMF 1998 (Issue 7)	LC - 01
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Johnson Controls Ltd, Dounreay

D

IRMF 1998 (Issue 7)	LD - 01
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Bristol General Hospital

F

IRMF 1998 (Issue 7)	LF - 01
---------------------	---------

British Nuclear Fuels plc (Sellafield)

G

IRMF 1998 (Issue 7)	LG - 01
---------------------	---------

Defence Radiological Standards Centre (DRaStaC)

H

IRMF 1998 (Issue 7)	LH - 01
IRMF 1998 (Issue 7)	LH - 02

Royal Naval College, Greenwich

I

IRMF 1998 (Issue 7)	LI - 01
IRMF 1998 (Issue 7)	LI - 02

National Radiological Protection Board (Chilton)

N

IRMF 1998 (Issue 7)	LN - 01
IRMF 1998 (Issue 7)	LN - 02
IRMF 1998 (Issue 7)	LN - 03
IRMF 1998 (Issue 7)	LN - 04
IRMF 1998 (Issue 7)	LN - 05
IRMF 1998 (Issue 7)	LN - 06

National Radiological Protection Board (Scotland)

O

IRMF 1998 (Issue 7)	LO - 01
IRMF 1998 (Issue 7)	LO - 02

National Radiological Protection Board (Northern)

P

IRMF 1998 (Issue 7)	LP - 01
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National Radiological Protection Board (Southern)	Q
IRMF 1998 (Issue 7)	LQ - 01
IRMF 1998 (Issue 7)	LQ - 02
NE Technology Ltd	R
IRMF 1998 (Issue 7)	LR - 01
IRMF 1998 (Issue 7)	LR - 02
IRMF 1998 (Issue 7)	LR - 03
IRMF 1998 (Issue 7)	LR - 04
IRMF 1998 (Issue 7)	LR - 05
Magnox Electric plc	S
IRMF 1998 (Issue 7)	LS - 01
IRMF 1998 (Issue 7)	LS - 02
IRMF 1998 (Issue 7)	LS - 03
IRMF 1998 (Issue 7)	LS - 04
IRMF 1998 (Issue 7)	LS - 05
IRMF 1998 (Issue 7)	LS - 06
Radiation Protection Service, University of Leeds	T
IRMF 1998 (Issue 7)	LT - 01
IRMF 1998 (Issue 7)	LT - 02
RRPPS, Edgbaston	U
IRMF 1998 (Issue 7)	LU - 01
IRMF 1998 (Issue 7)	LU - 02
IRMF 1998 (Issue 7)	LU - 03
IRMF 1998 (Issue 7)	LU - 04
IRMF 1998 (Issue 7)	LU - 05
IRMF 1998 (Issue 7)	LU - 06
Radiation Protection Service, Velindre Hospital Cardiff	
IRMF 1998 (Issue 7)	LV - 01
IRMF 1998 (Issue 7)	LV - 02
IRMF 1998 (Issue 7)	LV - 03
IRMF 1998 (Issue 7)	LV - 04
St George's Hospital, London	W
IRMF 1997 (Issue 6)	LW - 01
IRMF 1997 (Issue 6)	LW - 02
Northern Ireland Radiation Protection Service	Y
IRMF 1998 (Issue 7)	LY - 01
IRMF 1998 (Issue 7)	LY - 02
Guy's & St Thomas' Hospital Trust	Z
IRMF 1998 (Issue 7)	LZ - 01
IRMF 1998 (Issue 7)	LZ - 02

INDEX OF CALIBRATION AND MEASUREMENT SERVICES

Alpha spectrometric activity and emission rate sources

Amersham International plc	NE - 02
Defence Radiological Standards Centre (DRaStaC)	NH - 01
Defence Radiological Standards Centre (DRaStaC)	NH - 02

Beta-ray - protection-level standard sources

National Physical Laboratory	PM - 04
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Beta-ray radiation

**Absorbed dose to air/tissue and absorbed dose to air/tissue rate;
directional dose equivalent and directional dose equivalent rate**

- ^{147}Pm , ^{204}Tl and ^{90}Sr + ^{90}Y beta-radiation sources

AEA Technology (Harwell)	LA - 06
National Radiological Protection Board (Chilton)	LN - 04
National Radiological Protection Board (Scottish)	LO - 01
NE Technology Ltd	LR - 05
RRPPS, Edgbaston	LU - 03
Radiation Protection Service, Velindre Hospital, Cardiff	LV - 04
Northern Ireland Radiation Protection Service	LY - 01

Beta-ray reference sources - emission rate

Amersham International plc	NE - 03
Defence Radiological Standards Centre (DRaStaC)	NH - 01

Gamma-rays - radionuclide sources

**Air kerma and air kerma rate;
ambient dose equivalent and ambient dose equivalent rate;
directional dose equivalent and directional dose equivalent rate**

- ^{60}Co radionuclide gamma-ray source

National Physical Laboratory	PM - 02
AEA Technology (Winfrith)	NB - 01
Johnson Controls Ltd, Dounreay	ND - 01
Defence Radiological Standards Centre (DRaStaC)	NH - 04
Magnox Electric plc	NS - 05
AEA Environment & Energy (Harwell)	LA - 02
British Nuclear Fuels plc (Sellafield)	LG - 01
Royal Naval College, Greenwich	LI - 01
National Radiological Protection Board (Chilton)	LN - 03
NE Technology Ltd	LR - 04
Radiation Protection Service, University of Leeds	LT - 01

- ²⁴¹Am radionuclide gamma-ray source

National Physical Laboratory	PM - 02
AEA Technology (Winfrith)	NB - 01
Johnson Controls Ltd, Dounreay	ND - 01
Defence Radiological Standards Centre (DRaStaC)	NH - 04
Magnox Electric plc	NS - 01
Defence Radiological Protection Service	NX - 01
AEA Technology (Harwell)	LA - 02
Royal Naval College, Greenwich	LI - 01
National Radiological Protection Board (Chilton)	LN - 03
National Radiological Protection Board (Scottish)	LO - 01
National Radiological Protection Board (Northern)	LP - 01
National Radiological Protection Board (Southern)	LQ - 01
Northern Ireland Radiation Protection Service	LY - 01
NE Technology Ltd	LR - 04
Radiation Protection Service, University of Leeds	LT - 01
RRPPS, Edgbaston	LU - 02
Radiation Protection Service, Velindre Hospital, Cardiff	LV - 01
Radiation Protection Service, Velindre Hospital, Cardiff	LV - 02
Guy's & St Thomas' Hospital, London	LZ - 01

- ¹³⁷Cs radionuclide gamma-ray source

National Physical Laboratory	PM - 02
AEA Technology (Winfrith)	NB - 01
Johnson Controls Ltd, Dounreay	ND - 01
Defence Radiological Standards Centre (DRaStaC)	NH - 04
Magnox Electric plc	NS - 01
Defence Radiological Protection Service	NX - 01
AEA Technology (Harwell)	LA - 02
British Nuclear Fuels plc (Sellafield)	LG - 01
Defence Radiological Standards Centre (DRaStaC)	LH - 01
Royal Naval College, Greenwich	LI - 01
National Radiological Protection Board (Chilton)	LN - 03
National Radiological Protection Board (Scottish)	LO - 01
National Radiological Protection Board (Northern)	LP - 01
National Radiological Protection Board (Southern)	LQ - 01
NE Technology Ltd	LR - 04
Northern Ireland Radiation Protection Service	LY - 01
Radiation Protection Service, University of Leeds	LT - 01
RRPPS, Edgbaston	LU - 02
Radiation Protection Service, Velindre Hospital, Cardiff	LV - 01
Radiation Protection Service, Velindre Hospital, Cardiff	LV - 02
Guy's & St Thomas' Hospital, London	LZ - 01

- ²²⁶Ra radionuclide gamma-ray source

Magnox Electric plc	NS - 01
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- 6 MeV accelerator-produced gamma-rays

Magnox Electric plc	LS - 04
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Neutron fluence and energy standards

Fluence and fluence rate; ambient dose equivalent and dose equivalent rate

- Accelerator-based standard neutron fields

- 8 keV to 5 MeV

National Physical Laboratory

PM - 06

- 2.7 MeV

National Physical Laboratory

PM - 06

Magnox Electric plc

LS - 03

- 13 MeV to 19 MeV

National Physical Laboratory

PM - 07

- 14.7 MeV

National Physical Laboratory

PM - 07

- ISO and other radionuclide source-based standard neutron fields

National Physical Laboratory

PM - 08

Defence Radiological Standards Centre (DRaStaC)

NH - 07

AEA Technology (Harwell)

LA - 01

AEA Technology (Harwell Instruments)

LC - 01

National Radiological Protection Board (Chilton)

LN - 05

Magnox Electric plc

LS - 03

- Source and accelerator based thermal neutron standard fields

National Physical Laboratory

PM - 05

Magnox Electric plc

LS - 03

Neutron radionuclide sources - emission rate and anisotropy

National Physical Laboratory

PM - 09

Performance testing of dosimetry services for external radiations according to published HSE protocols - Gamma-rays

AEA Technology (Winfrith)

NB - 01

Defence Radiological Protection Service

NX - 04

Defence Radiological Standards Centre (DRaStaC)

NH - 04

Radioactivity Standards

- Beta-ray emitting solution standards of radioactivity

National Physical Laboratory	PM - 11
Amersham International plc	NE - 01

- Dose calibration checking sources

Amersham International plc	NE - 02
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Environmental radioactivity standards

National Physical Laboratory	PM - 15
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- Flow rate radioactive particulate sampling

Magnox Electric plc	LS - 05
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Gamma counter checking sources

Amersham International plc	NE - 02
----------------------------	---------

- Gamma-ray reference sources

National Physical Laboratory	PM - 13
Amersham International plc	NE - 02
Defence Radiological Standards Centre (DRaStaC)	NH - 01

- Gamma-ray emitting solution standards of radioactivity

National Physical Laboratory	PM - 10
Amersham International plc	NE - 01

- Gas standards of radioactivity

National Physical Laboratory	PM - 12
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- Standards for sample oxidisers

Amersham International plc	NE - 02
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- Tritiated nitrogen for calibration of tritium-in-air monitors

National Physical Laboratory	PM - 12
Magnox Electric plc	LS - 01

**Radioactive surface contamination -
emission-rate standards and instrument calibration**

- ISO alpha-emitting large-area sources

National Physical Laboratory	PM - 14
Amersham International plc	NE - 03
Defence Radiological Standards Centre (DRaStaC)	NH - 03
DERA Radiological Protection Service	NX - 03
AEA Technology (Harwell)	LA - 04
Johnson Controls Ltd, Dounreay	LD - 01
Bristol General Hospital	LF - 01
Royal Naval College, Greenwich	LI - 02
National Radiological Protection Board (Chilton)	LN - 06
National Radiological Protection Board (Scottish)	LO - 01
National Radiological Protection Board (Northern)	LP - 01
National Radiological Protection Board (Southern)	LQ - 01
NE Technology Ltd	LR - 02
NE Technology Ltd	LR - 03
Magnox Electric plc	LS - 02
Magnox Electric plc	LS - 06
RRPPS, Edgbaston	LU - 01
Northern Ireland Radiation Protection Service	LY - 01

**- ISO beta-emitting large-area sources
(maximum beta-emitting energy greater than 0.15 MeV)**

National Physical Laboratory	PM - 14
Amersham International plc	NE - 03
Defence Radiological Standards Centre (DRaStaC)	NH - 02
Defence Radiological Protection Service	NX - 03
AEA Technology (Harwell)	LA - 05
Johnson Controls Ltd, Dounreay	LD - 01
Bristol General Hospital	LF - 01
Defence Radiological Standards Centre (DRaStaC)	LH - 01
Royal Naval College, Greenwich	LI - 02
National Radiological Protection Board (Chilton)	LN - 06
National Radiological Protection Board (Scottish)	LO - 01
National Radiological Protection Board (Northern)	LP - 01
National Radiological Protection Board (Southern)	LQ - 01
NE Technology Ltd	LR - 02
NE Technology Ltd	LR - 03
Magnox Electric plc	LS - 02
Magnox Electric plc	LS - 06
Radiation Protection Service, University of Leeds	LT - 02
RRPPS, Edgbaston	LU - 01
Northern Ireland Radiation Protection Service	LY - 02
Guy's & St Thomas' Hospital, London	LZ - 02

- ISO photon and electron emitting (maximum energy less than 0.15 MeV)
large area sources
 - Royal Naval College, Greenwich LI - 02
 - Magnox Electric plc LS - 06
- Alpha and beta surface contamination sources for calibrating filter-paper counters
 - AEA Technology (Harwell) LA - 07
- Gamma-emitting, large area source
 - Johnson Controls Ltd, Dounreay LD - 01
 - Bristol General Hospital LF - 01
 - Guy's & St Thomas' Hospital, London LZ - 02
- Other alpha sources (^{226}Ra and ^{232}Th)
- Photon contamination sources
 - Bristol General Hospital LF - 01
 - National Radiological Protection Board (Chilton) LN - 06
 - National Radiological Protection Board (Scottish) LO - 01
 - National Radiological Protection Board (Northern) LP - 01
 - National Radiological Protection Board (Southern) LQ - 01
 - Northern Ireland Radiation Protection Service LY - 02
 - Radiation Protection Service, University of Leeds LT - 02
 - RRPPS, Edgbaston LU - 01
- Tritium sources for 'smear-test' measuring instruments
 - AEA Technology (Harwell) LA - 08

X-rays - radiation qualities at kilovoltages from 10 to 300 kV

Air kerma and air kerma rate;

ambient dose equivalent and ambient dose equivalent rate;

directional dose equivalent and directional dose equivalent rate

- ISO 'Narrow-spectra' series (33 - 250 kV)

National Physical Laboratory	PM - 01
Defence Radiological Standards Centre (DRaStaC)	NH - 06
AEA Technology (Harwell)	LA - 03
National Radiological Protection Board (Chilton)	LN - 02
NE Technology Ltd	LR - 01
Magnox Electric plc	LS - 04
RRPPS, Edgbaston	LU - 04

- ISO 'Low air-kerma rate' series (8 - 211 kV)

AEA Technology (Harwell)	LA - 03
National Radiological Protection Board (Chilton)	LN - 02
Magnox Electric plc	LS - 04

- ISO 'Wide-spectra' series (45 - 208 kV)

AEA Technology (Harwell)	LA - 03
National Radiological Protection Board (Chilton)	LN - 02
NE Technology Ltd	LR - 01
RRPPS, Edgbaston	LU - 04

- ISO 'High air-kerma rate' series (7.5 - 147 kV)

National Radiological Protection Board (Chilton)	LN - 02
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- ISO 'Fluorescence X-ray' series (8.6 - 75 kV)

Defence Radiological Standards Centre (DRaStaC)	LH - 02
National Radiological Protection Board (Chilton)	LN - 02

- IPSM Spectra (incident) (25 - 35 kVp and 50 - 120 kVp)

RRPPS, Edgbaston	LU - 05
RRPPS, Edgbaston	LU - 06

- Non-specific X-ray qualities (8 to 250 kV)

Radiation Protection Service, Velindre Hospital, Cardiff	LV - 03
St George's Hospital, London	LW - 01

- Calibration of kV meters and penetrameters

National Physical Laboratory	PM - 03
St George's Hospital, London	LW - 02

**CALIBRATION AND MEASUREMENT SERVICES
OFFERED
BY PRIMARY STANDARDS LABORATORIES**

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Graham Bass	E-mail:	graham.bass@npl.co.uk
Telephone:	0181 943 6256	Fax:	0181 943 6139

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>X-radiation</u>		
Air kerma	ISO narrow-spectrum series;	$\pm 1.5\%$ at 95% confidence level
Air kerma rate	8 to 250 keV 5 to 50 mGy h ⁻¹	
See leaflet <i>D1/0798/prot</i> , available on request, for further details		

Availability:	
On receipt of order ☐ By batch processing ☒ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time) Every Autumn; 12 week turn-round

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number: If service is not UKAS-accredited, please identify (a) quality system employed (eg <i>ISO 9001</i> , ...) (b) traceability to national measurement standards (eg <i>secondary standard instrument</i>)	yes ☒ [0478]

Signed: <i>Graham Bass</i>	NAME : GRAHAM BASS	Date: 5 January 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Graham Bass	E-mail:	graham.bass@npl.co.uk
Telephone:	0181 943 6256	Fax:	0181 943 6139

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Gamma-radiation</u>		
Air kerma	(a) 662 keV ^{137}Cs 5 to 200 mGy h ⁻¹	$\pm 1.3\%$ at 95% confidence level
Air kerma rate	(b) 1250 keV ^{60}Co 5 to 100 mGy h ⁻¹	
See leaflet <i>D1/0798/prot</i> , available on request, for further details	(c) 59 keV ^{241}Am 5 to 10 mGy h ⁻¹	

Availability:	
On receipt of order [] By batch processing [✓] By special arrangement []	Details (eg frequency of batch processing, turn-round time) Every Autumn; 12 week turn-round

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number: If service is not UKAS-accredited, please identify (a) quality system employed (eg <i>ISO 9001</i> ,...)	yes [✓] [0478]
(b) traceability to national measurement standards (eg <i>secondary standard instrument</i>)	

Signed:	<i>Graham Bass</i>	NAME : GRAHAM BASS	Date: 5 January 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory,		
	Centre for Ionising Radiation Metrology		
Address:	Teddington		
	Middlesex TW11 0LW		
Contact:	Graham Bass	E-mail:	graham.bass@npl.co.uk
Telephone:	0181 943 6256	Fax:	0181 943 6139

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Kilovoltage calibration of penetrameters and kV meters	25 to 150 kVp	Not exceeding $\pm 0.7\%$ at 95% confidence level

Availability:	
On receipt of order ☐ By batch processing ☒ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time) Every February; 12 week turn-round

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number: If service is not UKAS-accredited, please identify (a) quality system employed (eg <i>ISO 9001</i> ,...) (b) traceability to national measurement standards (eg <i>secondary standard instrument</i>)	yes ☒ [0478]

Signed:	<i>Graham Bass</i>	NAME : GRAHAM BASS	Date: 5 January 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Graham Bass		
Telephone:	0181 943 6256	Fax: 0181 943 6139	E-mail: gab@npl.co.uk

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Beta-radiation</u> Absorbed dose to air/tissue Directional dose equivalent, H'(007) Absorbed dose rate to tissue at 0.07 mm depth Directional dose equivalent rate See leaflet DRSA Dh007, available on request, for further details	0.2 to 2 MeV for sources ^{147}Pm , ^{204}Tl , ^{85}Kr , ^{90}Sr + ^{90}Y , 1 to 14 mGy h ⁻¹ * 1 to 14 mGy h ⁻¹ * * typical dose rates for recent source issues	 $\pm 4\%$ to $\pm 9\%$ at 95% confidence level

Availability:	
On receipt of order ☐ By batch processing ☒ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time)

Quality Assurance:	
Is your service NAMAS accredited?	yes ☒ no ☐
If not, please identify	
(a) quality system employed (eg ISO 9001,...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	Graham Bass	NAME : GRAHAM BASS	Date: 5 January 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	P Kolkowski	E-mail:	peter.kolkowski@npl.co.uk
Telephone:	0181 943 6855	Fax:	0181 943 7037

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Thermal neutron fluence and dose Irradiations, calibrations and # performance testing using neutron field produced by accelerator facility	Fluence rates:	
(a) thermal neutron beam diameter 30 cm	10^3 to $4 \times 10^4 \text{ cm}^{-2}\text{s}^{-1}$	$\pm 1.6\%$ at 95% confidence level for Wescott fluence
(b) thermal neutron standard facility; 150 cm^3 cavity	10^4 to $3 \times 10^7 \text{ cm}^{-2}\text{s}^{-1}$	$\pm 1.6\%$ at 95% confidence level for Wescott fluence
Thermal neutron fluence rate: measured at customer's facility	Fluence: 4×10^7 to $2 \times 10^{12} \text{ cm}^{-2}$	$\pm 1.0\%$ at 95% confidence level for Westcott fluence

Availability:		
On receipt of order	[✓]	Details (eg frequency of batch processing, turn-round time) Turn-round time less than 6 weeks
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:		
Is service UKAS-accredited? If so, give UKAS laboratory number:	yes [✓]	[0478]
If service is not UKAS-accredited, please identify		
(a) quality system employed (eg ISO 9001, ...)		
NPL Quality System, certificated to ISO 9001, covers non-accredited activities (marked with #)		
(b) traceability to national measurement standards (eg secondary standard instrument)		

Signed: P Kolkowski	NAME : P KOLKOWSKI	Date: 5 March 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Dr D J Thomas or Dr G C Taylor	E-mail:	david.thomas@npl.co.uk
Telephone:	0181 943 6853/7087	Fax:	0181 943 7037

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Neutron fluence and neutron energy for accelerator-based monoenergetic standard neutron fields. Neutron dose equivalent values are derived using internationally-accepted conversion factors. See leaflet DRSA Nh 002, available on request, for further details	Energy - # 8 to 70 keV 70 keV to 5 MeV Fluence rates - 1 to $1.5 \times 10^3 \text{ cm}^{-2}\text{s}^{-1}$ at 1 m from target, depending on energy	Fluence: $\pm 4\%$ at 95% confidence level depending on neutron energy Energy: $\pm 0.2\%$ at 95% confidence level depending on neutron energy

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) Turn-round time less than six weeks
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number: yes ☒ [0478]	
If service is not UKAS-accredited, please identify -	
(a) quality system employed (eg ISO 9001, ...)	
NPL Quality System, certificated to ISO 9001, covers non-accredited activities (marked with #)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	D J Thomas	NAME :	D J THOMAS	Date:	5 March 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory,		
	Centre for Ionising Radiation Metrology		
Address:	Teddington		
	Middlesex TW11 0LW		
Contact:	P Kolkowski	E-mail:	peter.kolkowski@npl.co.uk
Telephone:	0181 943 6855	Fax:	0181 943 7037

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Neutron fluence using accelerator- based monoenergetic neutron fields.	Energy range: 13.5 to 14.7 MeV	Fluence: $\pm 1.4\%$ at 95% confidence level, depending on neutron energy
Irradiation, calibration, overload tests	Neutron fluence rates:	
Dose equivalent values derived using internationally-accepted conversion factors.	10^3 to $1.5 \times 10^4 \text{ cm}^{-2}\text{s}^{-1}$ at 1 m from target	Energy: $\pm 0.3\%$ at 95% confidence level depending on neutron energy
Neutron fluence measured at customer's facility	Energy range: 13.5 to 19 MeV Neutron fluence: 5×10^8 to 10^{14} cm^{-2}	Fluence: $\pm 1.3\%$ at 95% confidence level, depending on neutron energy

Availability:	
On receipt of order []	Details (eg frequency of batch processing, turn-round time) Turn-round time less than six weeks
By batch processing []	
By special arrangement [✓]	

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number:	yes [✓] [0478]
If service is not UKAS-accredited, please identify -	
(a) quality system employed (eg ISO 9001, ...)	
NPL Quality System, certificated to ISO 9001, covers non-accredited activities (marked with #)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	P Kolkowski	NAME :	P KOLKOWSKI	Date:	5 March 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Dr G C Taylor	E-mail:	graeme.taylor1@npl.co.uk
Telephone:	0181 943 7087	Fax:	0181 943 7037

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
Neutron fluence for source-based standard neutron fields. Provided by range of radionuclide sources including those recommended for instrument calibration (ISO 8529) Neutron dose equivalent values are derived using internationally-accepted conversion factors. See leaflet DRSA Nh 003, available on request, for further details	Fluence rates - Up to $4 \times 10^2 \text{ cm}^{-2}\text{s}^{-1}$ at 1 m from the source; corresponding to a dose equivalent rate of 0.8 mSv h^{-1} Mean neutron energies - 22 keV to 4.1 MeV from range of sources - Am-Li, Am-F, Am-B, Am-Be and ^{252}Cf	± 1.5% at 95% confidence level

Availability:	
On receipt of order ☐ By batch processing ☐ By special arrangement ☒	Details (eg frequency of batch processing, turn-round time) Turn-round time less than six weeks

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number: yes ☒ [0478] If service is not UKAS-accredited, please identify - (a) quality system employed (eg ISO 9001, ...) (b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	G C Taylor	NAME :	G C TAYLOR	Date: 5 March 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Mr A G Bardell	Service enquiries:	M Burke
Telephone:	0181 943 6857/6854	Fax:	0181 943 7037 E-mail: alan.bardell@npl.co.uk

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Total neutron emission rate from radionuclide neutron sources		
(a) Manganese sulphate bath method	2×10^6 to 10^9 s^{-1}	$\pm 0.8\%$ to $\pm 1.0\%$ at 95% confidence level depending on source type and emission rate
(b) Moderating detector method	10^2 to $2 \times 10^6 \text{ s}^{-1}$	$\pm 1.0\%$ to $\pm 1.5\%$ at 95% confidence level depending on source type
Anisotropy of emission relative to the source axis	Anisotropy factor 0.5 to 1.2	$\pm 0.7\%$ to $\pm 1.0\%$ at 95% confidence level depending on source type

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) Turn-round time 2 to 4 weeks
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number: yes ☒ [0478]	
If service is not UKAS-accredited, please identify -	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	A G Bardell	NAME :	A G BARDELL	Date:	5 March 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Mike Woods	Tel: 0181 943 6425	E-mail: mike.woods@npl.co.uk
Service enquiries:	Matthew Carter	Fax:	0181 943 6161

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Activity</u> Standards of gamma-ray emitters for some 65 individual radionuclides Normally supplied as 3 g of solution in a flame-sealed BS specification glass ampoule See leaflet DRSA Rh 001, available on request, for further details	Normally between 1 Bq and 1 GBq Other activities may be available on request	$\pm 0.5\%$ to $\pm 5\%$ at 95% confidence level, depending on the nuclide

Availability:	
On receipt of order ☐ By batch processing ☒ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time) Turn-round time less than 6 weeks

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number If service is not UKAS-accredited, please identify (a) quality system employed (eg ISO 9001, ...)	yes ☒ [0478]
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed: MJ Woods	NAME: MJ Woods	Date: 1 July 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	John Makepeace	E-mail:	john.makepeace@npl.co.uk
Telephone:	0181 943 6480	Fax:	0181 943 6161

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Activity</u> Standards of pure beta-ray emitters for some 10 individual radionuclides Normally supplied as 3 g of solution in a flame-sealed BS specification glass ampoule See leaflet DRSA Rh 002, available on request, for further details	Normally between 1 MBq and 10 MBq Other activities may be available on request	$\pm 0.7\%$ to $\pm 2\%$ at 95% confidence level, depending on the nuclide

Availability:	
On receipt of order ☐ ☐ By batch processing ☐ ☐ By special arrangement ☐ ☒	Details (eg frequency of batch processing, turn-round time) Turn-round time less than 6 weeks

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number If service is not UKAS-accredited, please identify (a) quality system employed (eg ISO 9001, ...) NPL Quality System, certificated under ISO 9001 (b) traceability to national measurement standards (eg secondary standard instrument) Primary standards used as basis of calibration	yes ☐ ☐ no ☒ ☐

Signed:	J L Makepeace	NAME :	J L MAKEPEACE	Date:	5 July 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	John Makepeace	E-mail:	john.makepeace@npl.co.uk
Telephone:	0181 943 6480	Fax:	0181 943 6161

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Activity</u>		
(a) Activity of ^{85}Kr Supplied in glass break-seal ampoule	Minimum activity 20 MBq	$\pm 1.2\%$ at 95% confidence level
(b) Activity of ^{133}Xe Supplied in glass break-seal ampoule	Minimum activity 0.4 MBq	
(c) Radioactive concentration of ^{85}K in cylinder containing research- grade Kr gas	Minimum activity $\sim 0.1 \text{ kBq cm}^{-3}$ at STP	
(d) Radioactive concentration of ^3H in cylinder containing dry nitrogen	Minimum activity $\sim 0.1 \text{ kBq cm}^{-3}$ at STP	
CONTINUED		

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) Turn-round time less than 6 weeks
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number	yes ☐ no ☒
If service is not UKAS-accredited, please identify	
(a) quality system employed (eg ISO 9001, ...) NPL Quality System, certificated under ISO 9001	
(b) traceability to national measurement standards (eg secondary standard instrument) Primary standards used as basis of calibration	

Signed:	J L Makepeace	NAME:	J L MAKEPEACE	Date:	1 July 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1C

Continuation Sheet

Please complete using typescript with black ink. Forms will be reproduced as supplied.

Description of Service (continued):

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Special services: It may be possible to provide a sample of standardised gas in a special form, eg. in customer's own calibration vessel Testing and/or calibration of radioactive gas monitors may be carried out using previously standardised ^3H or ^{85}Kr See leaflet DRSA Rh 003, available on request, for further details	To be advised To be advised	To be advised To be advised

Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	John Makepeace	E-mail:	john.makepeace@npl.co.uk
Telephone:	0181 943 6480	Fax:	0181 943 6161

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Activity</u> Gamma ray reference sources for some 20 individual radionuclides Supplied as deposited active material, maximum diameter less than 5 mm, sealed in polyethylene and mounted in an aluminium ring	4 kBq to 400 kBq	$\pm 0.4\%$ to $\pm 2\%$ at 95% confidence level, depending on the radionuclide

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) Turn-round time less than 6 weeks
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number	yes ☒ [0478]
If service is not UKAS-accredited, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	J L Makepeace	NAME :	J L MAKEPEACE	Date:	1 July 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Mike Woods	Tel: 0181 943 6425	E-mail: mike.woods@npl.co.uk
Service enquiries:	Matthew Carter	Fax:	0181 943 6161

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Emission rate for alpha-ray and beta-ray emitting large area sources Intended primarily for nuclides recommended for the calibration of surface contamination monitors (ISO 8769) See leaflet DRSA Rh 005, available on request, for further details	Recommended surface emission rate: 2000 s⁻¹ to 10,000 s⁻¹ Recommended source size: 10 cm x 15 cm; minimum source area: 100 cm²	$\pm 2\%$ to $\pm 7\%$ at 95% confidence level, depending on the nuclide and the source

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) Turn-round time less than 6 weeks
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number	yes ☒ [0478]
If service is not UKAS-accredited, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	M J Woods	NAME:	M J WOODS	Date:	1 July 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Physical Laboratory, Centre for Ionising Radiation Metrology		
Address:	Teddington Middlesex TW11 0LW		
Contact:	Mike Woods	Tel: 0181 943 6425	E-mail: mike.woods@npl.co.uk
Service enquiries:	Matthew Carter	Fax:	0181 943 6161

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Activity of low level, environmental radioactivity standard solutions Supplied as single nuclide or a mixed nuclide standard as 10 g nominal of solution in a flame-sealed, 10 ml BS specification glass ampoule See leaflet DRSA Rh 009, available on request, for further details	0.1 to 1000 Bq g ⁻¹	$\pm 2\%$ at 95% confidence level

Availability:	
On receipt of order ☒	Details (eg frequency of batch processing, turn-round time) Short-lived nuclides by return
By batch processing ☐	
By special arrangement ☐	

Quality Assurance:	
Is service UKAS-accredited? If so, give UKAS laboratory number	yes ☒ [0478]
If service is not UKAS-accredited, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	M J Woods	NAME: M J WOODS	Date: 1 July 1998
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CALIBRATION AND MEASUREMENT SERVICES
OFFERED BY
UKAS-ACCREDITED LABORATORIES

Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute: AEA Technology plc.		
Address: Building A56 Winfrith Technology Centre, Nr Dorchester, Dorset, DT2 8DH		
Contact: Mr J A Simpson		
Telephone: 01305 202497	Fax: 01305 202527	E-mail: john.simpson@aeat.co.uk

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
1. Air kerma rate	<u>Co-60</u> 280 μ Gy/h - 50 mGy/h	$\pm 3\%$ 95% confidence limit
	<u>Cs-137</u> 0.25 μ Gy/h - 2 μ Gy/h	$\pm 5\%$ 95% confidence limit
	2 μ Gy/h - 6 Gy/h	$\pm 3\%$ 95% confidence limit
	<u>Am-241</u> 3 μ Gy/h - 2.5 mGy/h	$\pm 10\%$ 95% confidence limit
2. Ambient dose equivalent	<u>Co-60</u> 325 μ Sv/h - 58 mSv/h	$\pm 3\%$ 95% confidence limit
	<u>Cs-137</u> 0.25 μ Sv/h - 2 μ Sv/h	$\pm 5\%$ 95% confidence limit
	2 μ Sv/h - 7 Sv/h	$\pm 3\%$ 95% confidence limit
	<u>Am-241</u> 5 μ Sv/h - 4.5 mSv/h	$\pm 10\%$ 95% confidence limit
Performance testing of dosimetry services for external radiations	Penetrating dose equivalent 0.6 mSv - 250 mSv. Absorbed dose to tissue 0.26 Gy - 6 Gy	$\pm 3\%$ 95% confidence limit

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time) Turn round time normally within one week of receipt of instrument.
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:		
Is service UKAS accredited?	yes ☒	UKAS laboratory number: 0210
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
(b) traceability to national measurement standards (eg use of secondary standard instrument)		

Signed:	<i>J A Simpson</i>	NAME: J A SIMPSON	Date: 16 January 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Johnson Controls Ltd		
Address:	Room 62, Building D1313 Dounreay Thurso, Caithness KW14 7TZ		
Contact:	Don Mackenzie		
Telephone:	01847 8023 27/28	Fax: 01847 8023 30	E-mail: don.mackenzie@jci.com

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Air Kerma Rate	^{137}Cs $1 \mu\text{Gy h}^{-1}$ to $10 \mu\text{Gy h}^{-1}$ $10 \mu\text{Gy h}^{-1}$ to 200mGy h^{-1} ^{60}Cs $15 \mu\text{Gy h}^{-1}$ to 150mGy h^{-1} ^{241}Am $20 \mu\text{Gy h}^{-1}$ to $500 \mu\text{Gy h}^{-1}$	$\pm 6 \%$ at 95% confidence level $\pm 4 \%$ at 95% confidence level $\pm 4 \%$ at 95% confidence level $\pm 10 \%$ at 95% confidence level
Ambient Dose Equivalent Rate	^{137}Cs $1 \mu\text{Sv h}^{-1}$ to $10 \mu\text{Sv h}^{-1}$ $10 \mu\text{Sv h}^{-1}$ to 200mSv h^{-1} ^{60}Cs 15mSv h^{-1} to 150mSv h^{-1} ^{241}Am $35 \mu\text{Sv h}^{-1}$ to $850 \mu\text{Sv h}^{-1}$	$\pm 6 \%$ at 95% confidence level $\pm 4 \%$ at 95% confidence level $\pm 4 \%$ at 95% confidence level $\pm 10 \%$ at 95% confidence level

Availability:	
On receipt of order ☒ By batch processing ☐ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time) 7 working days

Quality Assurance:	
Is service UKAS accredited?	yes ☒ UKAS laboratory number: 0573
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
Certificated by LRQA to ISO 9002 for repair and calibration of radiological protection instruments	
(b) traceability to national measurement standards (eg secondary standard instrument)	
NPL calibrated secondary standard Ionex Dosemaster and chamber	

Signed:	D Mackenzie	NAME: D MACKENZIE	Date: 19 January 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Nycomed Amersham plc		
Address:	White Lion Road Amersham, Buckinghamshire HP7 9LL		
Contact:	Mr W F Case		
Telephone:	0494 543258	Fax:	01494 54 3881
		E-mail:	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Activity of standardised solutions</u>		At not less than 99.7 % confidence level
Individual radionuclides	40 kBq to 4 MBq	0.4 %
Standards for liquid scintillation counting	60 kBq to 333 kBq	1.3 %
Mixed radionuclide gamma ray reference solutions	Depends on mixture of radionuclides; typically up to 180 kBq total	0.6 %

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time)
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:		
Is service UKAS accredited?	yes ☒	UKAS laboratory number: 0146
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
(b) traceability to national measurement standards (eg secondary standard instrument)		

Signed: W F Case	NAME: W F CASE	Date: 10 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Nycomed Amersham plc		
Address:	White Lion Road Amersham, Buckinghamshire HP7 9LL		
Contact:	Mr W F Case		
Telephone:	0494 543258	Fax:	01494 54 3881
		E-mail:	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Activity of calibrated sources		
Mixed radionuclide gamma ray reference sources (i) disc point sources	Depends on the mixture of radionuclides; typically 40 kBq total	0.7 %
Standards for sample oxidisers (i) ^{14}C	5×10^3 dpm	2.4 %
(ii) tritium	10×10^3 dpm	3.3 %
Resin bead gamma reference sources	40 kBq to 400 kBq	1.8 %
Dose calibration checking sources	Up to 185 MBq depending on nuclide;	1.4 %
Gamma counter checking sources	typically 3.7 kBq	1.9 %

Availability:	
On receipt of order ☒	Details (eg frequency of batch processing, turn-round time)
By batch processing ☐	
By special arrangement ☐	

Quality Assurance:	
Is service UKAS accredited?	yes ☒
UKAS laboratory number: 0146	
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	W F Case	NAME:	W F CASE	Date:	10 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Nycomed Amersham plc		
Address:	White Lion Road Amersham, Buckinghamshire HP7 9LL		
Contact:	Mr W F Case		
Telephone:	0494 543258	Fax:	01494 54 3881
E-mail:			

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Emission Rate, α - particles</u>		
²⁴¹ Am and mixed nuclide spectrometer calibration sources	Depends on the mixture of radionuclides up to 1500 α s ⁻¹	0.8 %
Large area sources for calibrating contamination monitors	90 - 1500 α s ⁻¹	5 %

Availability:	
On receipt of order ☒ By batch processing ☐ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time)

Quality Assurance:	
Is service UKAS accredited?	yes ☒ UKAS laboratory number: 0146
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	W F Case	NAME :	W F CASE	Date:	10 February 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Nycomed Amersham plc		
Address:	White Lion Road Amersham, Buckinghamshire HP7 9LL		
Contact:	Mr W F Case		
Telephone:	0494 543258	Fax:	01494 54 3881
		E-mail:	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Emission rate, β- Particles</u>		
Beta reference sources	40- 1800 β s ⁻¹	0.8 %
Large area sources for calibrating contamination monitors		5 %

Availability:	
On receipt of order [✓] By batch processing [] By special arrangement []	Details (eg frequency of batch processing, turn-round time)

Quality Assurance:	
Is service UKAS accredited? yes [✓] If not, please identify (a) quality system employed (eg ISO 9001, ...) (b) traceability to national measurement standards (eg secondary standard instrument)	UKAS laboratory number: 0146

Signed:	W F Case	NAME :	W F CASE	Date: 10 February 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Defence Radiological Standards Centre				
Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR				
Contact:	S. Candlin / A. Edwards				
Telephone:	01189 827478	Fax:	01189 824813		E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
EMISSION RATE		
Alpha Particle Reference Sources (Class 1, Class 2 and Working)	Point sources Extended area sources up to 100mm x 150mm	$\pm 2\%$ (at 95% CL)
Beta Particle Reference Sources (Class 1, Class 2 and Working)	Point sources Extended area sources up to 100mm x 150mm	$\pm 2\%$ (at 95% CL)
Photon Reference Sources (Class 1, Class 2 and Working)	ISO8769-2 specified filtered extended area sources 100mm x 100mm	$^{241}\text{Am}, ^{57}\text{Co} : \pm 7\%$ $^{55}\text{Fe}, ^{129}\text{I} : \pm 9\%$ $^{238}\text{Pu}, ^{137}\text{Cs}, ^{60}\text{Co} : \pm 12\%$ (at 95% CL)

Availability:		
On receipt of order	[X]	<i>Details (eg frequency of batch processing, turn-round time)</i> Turn-round time 10 working days
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:		
Is service UKAS accredited?	yes [X]	UKAS laboratory number: 0296
If not, please identify		
(a) quality system employed (eg ISO 9001, . . .)		
(b) traceability to national measurement standards (eg use of secondary standard instrument)		
DRaStaC is the national primary standard laboratory for the realisation of 2 π photon emission rate		

Signed:	A. Edwards	NAME:	A. EDWARDS	Date:	November 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Defence Radiological Standards Centre		
Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR		
Contact:	S. Candlin / A. Edwards		
Telephone:	01189 827478	Fax: 01189 824813	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
ACTIVITY		
Gamma-ray Reference Sources	60keV - 2MeV	$\pm 2\%$ (at 95% CL)
Alpha Particle Emitters High Quality Reference Sources	4MeV - 6MeV >50Bq, 0 - 20mm diameter	$\pm 3\%$ (at 95% CL)
Continuous Air Monitor Calibration Sources	>10Bq, 0 - 100mm diameter	$\pm 5\%$ (at 95% CL)

Availability:		
On receipt of order	[X]	<i>Details (eg frequency of batch processing, turn-round time)</i> Turn-round time 10 working days
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:		
Is service UKAS accredited?	yes [X]	UKAS laboratory number: 0296
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
(b) traceability to national measurement standards (eg use of secondary standard instrument)		

Signed:	A. Edwards	NAME:	A. EDWARDS	Date: November 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR				
Contact:	S. Candlin / A. Edwards				
Telephone:	01189 827478	Fax:	01189 824813		E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
SURFACE CONTAMINATION MONITOR RESPONSE Radiological Type Tests including: cps/ emission rate cps/ (Bq cm ⁻²) (via a P-factor) linearity spatial response uniformity interfering radiations Statutory Tests of Surface Contamination Monitors	Alpha Nuclides: ^{nat} U, ²³⁸ Pu, ²⁴¹ Am Beta Nuclides: ³ H, ¹⁴⁷ Pm, ¹⁴ C, ⁶³ Ni ²⁰⁴ Tl, ³⁶ Cl, ⁹⁰ Sr/ ⁹⁰ Y Beta nuclide response interpolation over range 100kev - 2MeV Filtered Photon Nuclides: ⁵⁵ Fe, ²³⁸ Pu, ¹²⁹ I, ²⁴¹ Am ⁵⁷ Co, ¹³⁷ Cs, ⁶⁰ Co Photon nuclide response interpolation over range 5.9keV - 1.2MeV To protocols based on HS(G)49	$\pm 10\%$ (at 95% CL) $\pm 10\%$ (at 95% CL) $\pm 8 - 12\%$ (at 95% CL)

Availability:		
On receipt of order	☒ [X]	Details (eg frequency of batch processing, turn-round time) Turn-round time 10 working days
By batch processing	☐ []	
By special arrangement	☐ []	

Quality Assurance:		
Is service UKAS accredited?	yes ☒ [X]	UKAS laboratory number: 0296
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
(b) traceability to national measurement standards (eg use of secondary standard instrument)		
Filtered photon nuclide calibration programmed for NAMAS Accreditation in 1999.		

Signed:	A. Edwards	NAME:	A. EDWARDS	Date:	November 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR				
Contact:	S. Candlin / A. Edwards				
Telephone:	01189 827478	Fax:	01189 824813		E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
GAMMA-RAY DOSIMETRY		
Air KERMA Rate	^{60}Co : 20mGy^{-1} - 1.0Gy^{-1} ^{137}Cs : $2\mu\text{Gy}^{-1}$ - 0.8Gy^{-1} ^{241}Am : $55\mu\text{Gy}^{-1}$	$\pm 3\%$ (at 95% CL) $\pm 3\%$ (at 95% CL) $\pm 5\%$ (at 95% CL)
Ambient Dose Equivalent Rate, $\dot{H}^*(10)$	^{60}Co : 25mSv^{-1} - 1.2Sv^{-1} ^{137}Cs : $2.5\mu\text{Sv}^{-1}$ - 1.0Sv^{-1} ^{241}Am : $100\mu\text{Sv}^{-1}$	$\pm 3\%$ (at 95% CL) $\pm 3\%$ (at 95% CL) $\pm 5\%$ (at 95% CL)
Statutory tests of gamma RPI	To protocols based on HS(G)49	
Tertiary Standard Instruments	as air KERMA / ADE $\dot{H}^*(10)$	as air KERMA / ADE $\dot{H}^*(10)$

Availability:		
On receipt of order	[X]	Details (eg frequency of batch processing, turn-round time) Turn-round time 10 working days
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:	
Is service UKAS accredited?	yes [X] UKAS laboratory number: 0296
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg use of secondary standard instrument)	

Signed:	A. Edwards	NAME:	A. EDWARDS	Date:	November 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR				
Contact:	S. Candlin / A. Edwards				
Telephone:	01189 827478	Fax:	01189 824813		E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
GAMMA-RAY DOSIMETRY		
Personal Dose Equivalent		
Performance testing of Approved Dosimetry Services	To HSE Protocols	$\pm 3\%$ (at 95% CL)
Routine Irradiation of Personal Dosimeters	100 μ Sv - 50mSv	$\pm 7\%$ (at 95% CL)

Availability:		
On receipt of order	☒ [X]	Details (eg frequency of batch processing, turn-round time) Turn-round time 10 working days
By batch processing	☐ []	
By special arrangement	☐ []	

Quality Assurance:		
Is service UKAS accredited?	yes ☒ [X]	UKAS laboratory number: 0296
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
(b) traceability to national measurement standards (eg use of secondary standard instrument)		

Signed:	A. Edwards	NAME:	A. EDWARDS	Date:	November 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR		
Contact:	S. Candlin / A. Edwards		
Telephone:	01189 827478	Fax: 01189 824813	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
X-RAY DOSIMETRY	ISO Narrow Series Qualities 33keV - 250keV	
Air KERMA Rate	0.5mGy⁻¹ - 25mGyh⁻¹ (Quality Dependent)	$\pm 3\%$ (at 95% CL)
Ambient Dose Equivalent Rate, H⁺(10)	1mSvh⁻¹ - 50mSvh⁻¹ (Quality Dependent)	$\pm 3\%$ (at 95% CL)
Statutory tests of gamma RPI	To protocols based on HS(G)49	
Personal Dose Equivalent Performance testing of Approved Dosimetry Services	To HSE Protocols	$\pm 3\%$ (at 95% CL)
Routine Irradiation of Personal Dosimeters	200μSv - 20mSv	$\pm 8\%$ (at 95% CL)

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time) Turn-round time 10 working days
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:		
Is service UKAS accredited?	yes ☒	UKAS laboratory number: 0296
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
(b) traceability to national measurement standards (eg use of secondary standard instrument)		

Signed:	A. Edwards	NAME:	A. EDWARDS	Date:	November 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Institute:	Defence Radiological Standards Centre				
Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR				
Contact:	S. Candlin / A. Edwards				
Telephone:	01189 827478	Fax:	01189 824813		E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
NEUTRON MEASUREMENTS	Radionuclide neutron sources ^{252}Cf and Am/Be	
4π Neutron Emission Rate	^{252}Cf : 10^4 s^{-1} - 10^7 s^{-1} Am/Be: 10^4 s^{-1} - 10^7 s^{-1}	$\pm 3\%$ (at 95% CL) $\pm 5\%$ (at 95% CL)
Neutron Flux Density	^{252}Cf : $2 - 320 \text{ s}^{-1} \text{ cm}^{-2}$ Am/Be: $6.5 - 65 \text{ s}^{-1} \text{ cm}^{-2}$	$\pm 3\%$ (at 95% CL) $\pm 5\%$ (at 95% CL)
Ambient Dose Equivalent Rate, $H^*(10)$	^{252}Cf : $2.5 \mu\text{Sv h}^{-1}$ - $400 \mu\text{Sv h}^{-1}$ Am/Be: $10 \mu\text{Sv h}^{-1}$ - $100 \mu\text{Sv h}^{-1}$	$\pm 3\%$ (at 95% CL) $\pm 5\%$ (at 95% CL)
Statutory tests of neutron RPI	To protocols based on HS(G)49	
Personal Dose Equivalent, $H_p(10)$	^{252}Cf : $10 \mu\text{Sv}$ - 10 mSv Am/Be: $10 \mu\text{Sv}$ - 10 mSv	$\pm 3\%$ (at 95% CL) $\pm 5\%$ (at 95% CL)

Availability:		
On receipt of order	☒ [X]	Details (eg frequency of batch processing, turn-round time) Turn-round time 10 working days
By batch processing	☐ []	
By special arrangement	☐ []	

Quality Assurance:		
Is service UKAS accredited?	yes ☒ [X]	UKAS laboratory number: 0296
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
(b) traceability to national measurement standards (eg use of secondary standard instrument)		

Signed:	A. Edwards	NAME:	A. Edwards	Date:	November 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Magnox Electric plc		
Address:	Radiation Metrology Group Berkeley Centre Berkeley, GLOUCS GL13 9PB		
Contact:	G S Wilkinson-Tough		
Telephone:	01453 812867	Fax:	01453 812112
E-mail:			

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Photon air kerma rate or ambient dose equivalent rate	^{60}Co 2 mSv h ⁻¹ - 5 Sv h ⁻¹	$\pm 3\%$ at 95% confidence level
	^{137}Cs 0.2 $\mu\text{Sv h}^{-1}$ - 1 Sv h ⁻¹	$\pm 3\%$ at 95% confidence level
	^{226}Ra 0.1 $\mu\text{Sv h}^{-1}$ - 2 mSv h ⁻¹	$\pm 7\%$ at 95% confidence level
	^{241}Am 50 $\mu\text{Sv h}^{-1}$ - 2 mSv h ⁻¹	$\pm 3\%$ at 95% confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) 14 Day Turnaround
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is service UKAS accredited?	yes ☒
UKAS laboratory number: 0542	
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed: G S Wilkinson-Tough	NAME : G S Wilkinson-Tough	Date: 18 Feb 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	DERA Radiation Protection Services		
Address:	Institute of Naval Medicine Alverstoke, Gosport HAMPSHIRE PO12 2DL		
Contact:	Mr J T B Bennett		
Telephone:	01705 76 8170	Fax: 01705 76 8150	E-mail:

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
Air kerma rate Ambient dose equivalent rate	¹³⁷ Cs 3 µSv h ⁻¹ to 50 mSv h ⁻¹	4% at 95% confidence level
	²⁴¹ Am 50 µSv h ⁻¹	8% at 95% confidence level

Availability:		
On receipt of order	[✓]	Details (eg frequency of batch processing, turn-round time) Turn -round time: maximum 10 days from receipt of instrument.
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:		
Is service UKAS accredited?	yes [✓]	UKAS laboratory number: 0477
If not, please identify		
(a) quality system employed (eg ISO 9001, ...) DERA Radiation Protection Services is also registered to BS EN ISO 9002		
(b) traceability to national measurement standards (eg secondary standard instrument)		

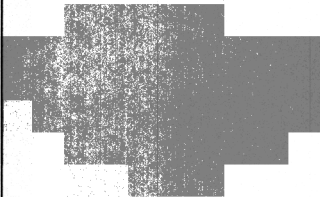
Signed:	J T B Bennett	NAME : J T B BENNETT	Date: 2 January 1996
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	DERA Radiation Protection Services		
Address:	Institute of Naval Medicine Alverstoke, Gosport HAMPSHIRE PO12 2DL		
Contact:	Mr J T B Bennett		
Telephone:	01705 76 8170	Fax:	01705 76 8150
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Routine irradiations of personal dosemeters 	100 μSvh^{-1} - 50 mSvh^{-1}	$\pm 4\%$ at 95% confidence level

Availability:	
On receipt of order ☒	Details (eg frequency of batch processing, turn-round time) Turn -round time: maximum 10 days from receipt of instrument.
By batch processing ☐	
By special arrangement ☐	

Quality Assurance:	
Is service UKAS accredited? yes ☒	UKAS laboratory number: 0477
If not, please identify (a) quality system employed (eg ISO 9001, ...) DERA Radiation Protection Services is also registered to BS EN ISO 9002. (b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	J T B Bennett	NAME :	J T B BENNETT	Date:	2 January 1996
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	DERA Radiation Protection Services		
Address:	Institute of Naval Medicine Alverstoke, Gosport HAMPSHIRE PO12 2DL		
Contact:	Mr J T B Bennett		
Telephone:	01705 76 8170	Fax:	01705 76 8150
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Surface contamination monitors	Alpha emitters: ^{241}Am ^{238}Pu Beta emitters: $^{90}\text{Sr}/^{90}\text{Y}$ ^{147}Pm ^{36}Cl ^{14}C	$\pm 6\%$ to 10% at 95% confidence level, depending on monitor type.

Availability:	
On receipt of order [✓] By batch processing [] By special arrangement []	Details (eg frequency of batch processing, turn-round time) Turn -round time: maximum 10 days from receipt of instrument.

Quality Assurance:	
Is service UKAS accredited? yes [✓] If not, please identify (a) quality system employed (eg ISO 9001, ...) DERA Radiation Protection Services is also registered to BS EN ISO 9002 (b) traceability to national measurement standards (eg secondary standard instrument)	UKAS laboratory number: 0477

Signed: J T B Bennett	NAME : J T B BENNETT	Date: 2 January 1996
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Institute:	DERA Radiation Protection Services		
Address:	Institute of Naval Medicine Alverstoke, Gosport HAMPSHIRE PO12 2DL		
Contact:	Mr J T B Bennett		
Telephone:	01705 76 8170	Fax:	01705 76 8150
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Personal dose equivalent Performance testing of personal dosimetry services for external radiations	HSE Protocols	$\pm 4\%$ at 95% confidence level

Availability:	
On receipt of order ☒	Details (eg frequency of batch processing, turn-round time) Turn-round time: maximum 10 days from receipt of instrument.
By batch processing ☐	
By special arrangement ☐	

Quality Assurance:	
Is service UKAS accredited? yes ☒	UKAS laboratory number: 0477
If not, please identify (a) quality system employed (eg ISO 9001, ...) DERA Radiation Protection Services is also registered to BS EN ISO 9002 (b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	J T B Bennett	NAME :	J T B BENNETT	Date:	2 January 1996
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CALIBRATION AND MEASUREMENT SERVICES
OFFERED BY
OTHER LABORATORIES

Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied

Institute:	Radiation Dosimetry Department		
Address:	AEA Environment and Energy Bldg. 364, Harwell Laboratory Oxfordshire, OX11 0RA		
Contact:	H J Delafield		
Telephone:	0235-434099	Telex:	83135 ATOMHA G
		Fax:	(0235) 432134

Service details:		
Measured Quantity Instrument Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Neutron dose equivalent rate/ Neutron fluence rate calibration of instruments	<u>$^{241}\text{Am-Be}$ neutrons</u> 5-1500 $\mu\text{Sv h}^{-1}$	(i) Precision calibrations using free-in-air calibration facility - $\pm 6\%$ (95% confidence limits)
	<u>^{252}Cf neutrons</u> 5-5000 $\mu\text{Sv h}^{-1}$	(ii) Routine calibration using free-in-air calibration jig - $\pm 10\%$ (95% confidence limits)

Availability:		
On receipt of order	[]	Details (eg frequency of batch processing, turn-round time, . . .)
By batch processing	[]	
By special arrangement	[✓]	
For in-house and external customers		

Quality Assurance:		
Is your service NAMAS accredited?	yes []	no [✓]
If not, please identify		
NAMAS Accreditation will be applied for		
(a)	any other quality system employed (eg BS 5750, . . .)	
	ISO 8529 for free-in-air calibration facility	
(b)	any traceability to national measurement standards (eg use of secondary standard instrument)	
	Neutron source strengths traceable to NPL calibrations.	
	Calibration jig calibrated using transfer instrument of type to be tested.	

Signed: <i>H.J. Delafield</i>	Name: H J Delafield	Date: 15/11/91
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied

Institute:	Radiation Dosimetry Department		
Address:	AEA Environment and Energy Bldg. 364, Harwell Laboratory Oxfordshire, OX11 0RA		
Contact:	Dr P D Holt		
Telephone:	0235-821111 Ext.4060	Telex:	83135 ATOMHA G
		Fax:	(0235) 434887

Service details:		
Measured Quantity Instrument Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Air kerma (Gy)	^{137}Cs $0.2 \mu\text{Sv h}^{-1}$ to 100 mSv h^{-1}	$\pm 3\%$ (95% confidence limits)
	^{60}Co $15 \mu\text{Sv h}^{-1}$ to $650 \mu\text{Sv h}^{-1}$	
	^{241}Am $8 \mu\text{Sv h}^{-1}$ to 1.6 mSv h^{-1}	

Availability:	
On receipt of order ☐ By batch processing ☒ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time, . . .) Turn round time - 3 days

Quality Assurance:	
Is your service NAMAS accredited? yes ☐ no ☒	
If not, please identify NAMAS Accreditation will be applied for	
(a)	any other quality system employed (eg BS 5750,) BS5750
(b)	any traceability to national measurement standards (eg use of secondary standard instrument) Gamma dose rate secondary standard is calibrated at NPL

Signed: <i>P D Holt</i>	Name: P D Holt	Date: 15/10/91
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied

Institute:	Radiation Dosimetry Department		
Address:	AEA Environment and Energy Bldg. 364, Harwell Laboratory Oxfordshire, OX11 0RA		
Contact:	Dr R Birch		
Telephone:	0235-821111 Ext.6336	Telex:	83135 ATOMHA G
		Fax:	(0235) 432134

Service details:	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Measured Quantity Instrument Gauge		
Air kerma (Gy)	ISO Low exposure rate 30-211 keV Up to 4 mGy h ⁻¹ ISO Narrow series 33-205 keV Up to 50 mGy h ⁻¹ ISO Wide series 45-169 keV Up to 800 mGy h ⁻¹	$\pm 4\%$ (95% confidence limits)

Availability:		
On receipt of order	[]	Details (eg frequency of batch processing, turn-round time, . . .)
By batch processing	[]	
By special arrangement	[✓]	

Quality Assurance:		
Is your service NAMAS accredited?	yes []	no [✓]
If not, please identify		
NAMAS Accreditation will be applied for.		
(a)	any other quality system employed (eg BS 5750, . . .)	
	BS5750	
(b)	any traceability to national measurement standards (eg use of secondary standard instrument)	
	Secondary standard ionization chamber	

Signed: <i>R. Birch</i>	Name: Dr R Birch	Date: 15/11/91
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied.

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Radiation Dosimetry Department		
Address:	AEA Environment and Energy Bldg. 364, Harwell Laboratory Oxfordshire, OX11 0RA		
Contact:	Dr P D Holt		
Telephone:	0235-821111 Ext. 4060	Telex:	83135 ATOMHA G
		Fax:	(0235) 434887

Service details:	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Measured Quantity Instrument Gauge Surface contamination: alpha	^{241}Am 12 Bq cm^{-2} (Large Area Source 19.7 cm dia) Instrument linearity can be checked over the range 4-400 c.p.s. approx., using ^{241}Am sources 1 cm in diameter.	$\pm 10\%$ (95% confidence limits)

Availability:		
On receipt of order	☐	Details (eg frequency of batch processing, turn-round time, . . .)
By batch processing	☒	
By special arrangement	☐	
		Turn round time - 3 days

Quality Assurance:		
Is your service NAMAS accredited?	yes []	no [✓]
If not, please identify		
NAMAS Accreditation will be applied for		
(a)	any other quality system employed (eg BS 5750,)	BS5750
(b)	any traceability to national measurement standards (eg use of secondary standard instrument)	
Contamination test sources have DKD Accreditation certificates		

Signed: P. D. Holt. Name: P D Holt Date: 15/11/91

Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied

Institute:	Radiation Dosimetry Department
Address:	AEA Environment and Energy Bldg. 364, Harwell Laboratory Oxfordshire, OX11 0RA
Contact:	Dr P D Holt
Telephone:	0235-821111 Ext.4060 Telex: 83135 ATOMHA G Fax: (0235) 434887

<u>Service details:</u>	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Measured Quantity Instrument Gauge		
Surface contamination: beta	^{14}C (β , Emax 0.156 MeV) 12 Bq cm ⁻² ^{60}Co (β , Emax 0.32 MeV) 12 Bq cm ⁻² Instrument linearity can be checked over the range up to 3000 c.p.s. using the gamma-ray facility.	$\pm 10\%$ (95% confidence limits)

Availability:		
On receipt of order	[]	Details (eg frequency of batch processing, turn-round time, . . .)
By batch processing	[✓]	
By special arrangement	[]	
Turn round time - 3 days		

Quality Assurance:		
Is your service NAMAS accredited?	yes []	no [✓]
If not, please identify		
NAMAS Accreditation will be applied for		
(a)	any other quality system employed (eg BS 5750, . . .)	BS5750
(b)	any traceability to national measurement standards (eg use of secondary standard instrument)	
Contamination on test sources have DKD Accreditation certificates.		

Signed: <i>P.D. Holt</i>	Name: P D Holt	Date: <i>15/11/91</i>
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Radiation Dosimetry Department		
Address:	AEA Environment and Energy Bldg. 364, Harwell Laboratory Oxfordshire, OX11 0RA		
Contact:	Dr P D Holt		
Telephone:	0235-821111 Ext.4060	Telex:	83135 ATOMHA G
		Fax:	(0235) 434887

Service details:		
Measured Quantity Instrument Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Beta radiation dose rate	$^{90}\text{Sr}/^{90}\text{Y}$ 9.4 mGy h ⁻¹ ^{204}Tl 1.9 mGy h ⁻¹ ^{147}Pm 5.4 mGy h ⁻¹	$\pm 4\%$ $\pm 4.5\%$ (95% confidence limits) $\pm 9\%$

Availability:		
On receipt of order	[]	Details (eg frequency of batch processing, turn-round time, . . .)
By batch processing	[✓]	
By special arrangement	[]	
Turn round time - 3 days		

Quality Assurance:		
Is your service NAMAS accredited?	yes []	no [✓]
If not, please identify		
NAMAS Accreditation will be applied for		
(a)	any other quality system employed (eg BS 5750,)	
	BS5750	
(b)	any traceability to national measurement standards (eg use of secondary standard instrument)	
Secondary standard sources		

Signed: <i>P D Holt</i>	Name: P D Holt	Date: 15/11/91
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied

Institute:	Radiation Dosimetry Department		
Address:	AEA Environment and Energy Bldg. 364, Harwell Laboratory Oxfordshire, OX11 0RA		
Contact:	Dr P D Holt		
	Telephone: 0235-821111 Ext.4060	Telex: 83135 ATOMHA G	Fax: (0235) 434887

Service details:		
Measured Quantity	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Instrument Gauge		
α and β surface contamination for calibration of filter-paper counters	^{241}Am 1 kBq (51 Bq cm ⁻²) ^{14}C β (Emax 0.156 MeV) 1 kBq (51 Bq cm ⁻²) ^{36}Cl β (Emax 0.71 MeV) 1 kBq (51 Bq cm ⁻²)	$\pm 10\%$ (95% $\pm 10\%$ confidence $\pm 10\%$ limits)

Availability:		
On receipt of order	[]	Details (eg frequency of batch processing, turn-round time, . . .)
By batch processing	[]	
By special arrangement	[✓]	

Quality Assurance:		
Is your service NAMAS accredited?	yes []	no [✓]
If not, please identify		
(a)	any other quality system employed (eg BS 5750, . . .)	
(b)	any traceability to national measurement standards (eg use of secondary standard instrument)	
Sources have DKD certificates		

Signed: P. D. Holt.	Name: P D Holt	Date: 15/11/91
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service offered, using typescript with black ink. Forms will be reproduced as supplied

Institute: Radiation Dosimetry Department

Address: AEA Environment and Energy
Bldg. 364, Harwell Laboratory
Oxfordshire, OX11 0RA

Contact: Dr P D Holt

Telephone: 0235-821111 Ext.4060 **Telex:** 83135 ATOMHA G **Fax:** (0235) 434887

Service details:		
Measured Quantity Instrument Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Tritium smear test measurement instruments	200 Bq cm⁻² (3.8 cm diameter active area)	$\pm 10\%$ (95% confidence limits)

Availability:		
On receipt of order	☐	Details (eg frequency of batch processing, turn-round time, . . .)
By batch processing	☐	
By special arrangement	☒	
		For in-house and external customers

Quality Assurance:		
Is your service NAMAS accredited?	yes []	no [✓]
If not, please identify		
(a)	any other quality system employed (eg BS 5750,)	
	BS5750	
(b)	any traceability to national measurement standards (eg use of secondary standard instrument)	
	Source traceable to NPL	

Signed: P D Holt. Name: P D Holt Date: 15/11/91

Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	AEA Technology plc.		
Address:	Harwell Instruments 528-10 Unit 1, Harwell Laboratory Oxfordshire OX11 0RA		
Contact:	KP Lambert		
Telephone:	01235 434433	Fax: 01235 435336	E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Calibrated neutron sources		
Am Be	7.6×10^5 , $7 \times 10^6 \text{ s}^{-1}$	$\pm 1.5 \%$ eff. standard deviation
Am Li	6.3×10^3 , $6.9 \times 10^3 \text{ s}^{-1}$	$\pm 1 \%$ eff. standard deviation
Am B	$4.9 \times 10^4 \text{ s}^{-1}$	$\pm 1 \%$ eff. standard deviation
Am F	$1.6 \times 10^4 \text{ s}^{-1}$, $1.4 \times 10^5 \text{ s}^{-1}$	$\pm 1 \%$ eff. standard deviation

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time)
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
BS EN ISO 9001 : 1994	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Yes	

Signed:	K P Lambert	NAME:	K P LAMBERT	Date :	3 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Johnson Controls Ltd		
Address:	Room 62, Building D1313 Dounreay Thurso, Caithness KW14 7TZ		
Contact:	Don Mackenzie		
Telephone:	01847 8023 27/28	Fax: 01847 8023 30	E-mail: don.mackenzie@jci.com

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Calibration of surface contamination monitors	^{14}C ^{36}Cl ^{60}Cs $^{90}\text{Sr} + ^{90}\text{Y}$ ^{241}Am 50 mm linearity sources and 10*15 cm large area sources are available	$\pm 10\%$ at 95% confidence level

Availability:	
On receipt of order ☒ By batch processing ☐ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time) 7 working days

Quality Assurance:	
Is service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
Certificated by LRQA to ISO 9002 for repair and calibration of radiological protection instruments	
(b) traceability to national measurement standards (eg secondary standard instrument)	
All sources are calibrated at either NPL or DRaStaC	

Signed:	D Mackenzie	NAME: D MACKENZIE	Date: 19 January 1999
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Department of Medical Physics and Bioengineering		
Address:	Bristol General Hospital Guinea Street Bristol BS1 6SY		
Contact:	Ms E M Pitcher		
Telephone:	0117 928 6140	Fax: 0117 928 6371	E-mail: Liz.Pitcher@bristol.ac.uk

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Surface contamination monitors	α emitters: ^{241}Am β emitters: ^{14}C ^{147}Pm ^{36}Cl $^{90}\text{Sr}/^{90}\text{Y}$ ^{137}Cs γ emitters: ^{129}I ^{57}Co	$\pm 5\%$ to $\pm 10\%$ (depending on monitor type) at 95% confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time)
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	E M Pitcher	NAME:	E M PITCHER	Date:	13 February 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	The Health Physics Instrument Centre, BNFL		
Address:	B842 , British Nuclear Fuels plc , Sellafield		
	Seascale ,		
	CUMBRIA , CA20 IPG		
Contact:	Mr R E McConnell		
Telephone:	019467 76452	Fax: 019467 73041	E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
AIR KERMA RATE	Cs 137 0.15 μGy/hr - 3.4 Gy/hr	$\pm 5\%$ at 95% confidence level
	Co 60 0.17 mGy/hr - 0.7 Gy/hr	$\pm 3\%$ at 95% confidence level
AMBIENT DOSE EQUIVALENT	Cs 137 0.15μSv/hr - 4.1 Sv/hr	$\pm 5\%$ at 95% confidence level
	Co 60 0.19 mSv/hr - 0.8 Sv/hr	$\pm 3\%$ at 95% confidence level
Maximun Achievable Doserate	Cs 137 4.1 Sv/hr	

Availability:		
On receipt of order	☒	<i>Details (eg frequency of batch processing, turn-round time)</i>
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:		
Is service UKAS accredited?	yes ☐	no ☒
If not, please identify		
(a) quality system employed (eg ISO 9001, . . .)		
(b) traceability to national measurement standards (eg secondary standard instrument)		

Signed: R E McConnell	Name: R E McConnell	Date: 15 January 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Defence Radiological Standards Centre		
Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR		
Contact:	S. Candlin / A. Edwards		
Telephone:	01189 827478	Fax:	01189 824813
		E-mail:	n/a

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
GAMMA-RAY DOSIMETRY		
Absorbed Dose using ^{60}Co Irradiator	10mSv - 150Sv	$\pm 8\%$ (at 95% CL)
Personal Dose Equivalent, $H_p(10)$, using ^{137}Cs wide angle array	1mSv- 10mSv	$\pm 8\%$ (at 95% CL)
Ambient Dose Equivalent, $H^*(10)$, using low dose rate ^{137}Cs projector	$1\mu\text{Sv h}^{-1}$ - $20\mu\text{Sv h}^{-1}$	$\pm 8\%$ (at 95% CL)
GROUND CONTAMINATION RESPONSE		
Statutory Tests of Ground Contamination Monitors using 11 point spatial integration technique	Nuclides: ^{241}Am , ^{239}Pu , DU, HEU	$\pm 20\%$ (at 95% CL)

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time) Turn-round time 10 working days
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, . . .) ISO9001	
(b) traceability to national measurement standards (eg use of secondary standard instrument) Fricke Dosimetry, Secondary Standard Ionisation Chamber/ Electrometer, Traceably Calibrated Reference Standard Sources	

Signed:	A. Edwards	NAME:	A. EDWARDS	Date:	November 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Defence Radiological Standards Centre		
Address:	Building A29.1, AWE Aldermaston Reading, Berkshire RG7 4PR		
Contact:	S. Candlin / A. Edwards		
Telephone:	01189 827478	Fax:	01189 824813
		E-mail:	n/a

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
X-RAY DOSIMETRY	ISO Fluorescent Series Qualities 15.8keV - 75keV	
Air KERMA Rate	20mGy⁻¹ - 400μGyh⁻¹ (Quality Dependent)	±10% (at 95% CL)
Ambient Dose Equivalent Rate, H⁺(10)	10μSvh⁻¹ - 350μSvh⁻¹ (Quality Dependent)	±10% (at 95% CL)

Availability:	
On receipt of order ☒ [X] By batch processing ☐ [] By special arrangement ☐ []	Details (eg frequency of batch processing, turn-round time) Turn-round time 10 working days

Quality Assurance:	
Is your service UKAS accredited? If not, please identify (a) quality system employed (eg ISO 9001, . . .) ISO9001 (b) traceability to national measurement standards (eg use of secondary standard instrument) Secondary Standard Ionisation Chamber / Electrometer	yes ☐ no ☒ [X]

Signed: A. Edwards	NAME: A. EDWARDS	Date: November 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Royal Naval College		
Address:	Department of Nuclear Science and Technology Greenwich LONDON SE10 9NN		
Contact:	R B Manson		
Telephone:	0181 858 2154 Ext 4156	Fax:	0181 293 1982
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Photon Air Kerma Rate	¹³⁷ Cs 1.5 - 100 mGy h ⁻¹ (Reg. 397)	$\pm 5\%$ at 95% confidence level
	3.5 - 225 μ Gy h ⁻¹ (Reg. 620)	$\pm 6\%$ at 95% confidence level
	20 - 130 μ Gy h ⁻¹ (Reg. 118)	$\pm 8\%$ at 95% confidence level
	⁶⁰ Co 20 - 1250 μ Gy h ⁻¹ (Reg. 180)	$\pm 7\%$ at 95% confidence level
	²⁴¹ Am 3 - 40 μ Gy h ⁻¹ (Reg. 514)	$\pm 8\%$ at 95% confidence level

Availability: DNST facilities are not currently available for commercial use

On receipt of order	[]	Details (eg frequency of batch processing, turn-round time)
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:

Is your service UKAS accredited? yes [] no [☒]

If not, please identify

(a) quality system employed (eg ISO 9001, ...)
A quality system meeting requirements of ISO 9001 (incorporating recommendations of ISO 10012-1) and MoD policy is operated for testing of portable and installed radiation monitors in DNST

(b) traceability to national measurement standards (eg secondary standard instrument)
Traceability via tertiary standards calibrated against secondary standards held by DRaStaC

Signed: R B Manson

NAME: R B MANSON

Date: 20 December 1996

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Royal Naval College		
Address:	Department of Nuclear Science and Technology Greenwich LONDON SE10 9NN		
Contact:	R B Manson		
Telephone:	0181 858 2154 Ext 4156	Fax:	0181 293 1982
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Surface Emission Rate		
Beta standards	$^{90}\text{Sr}/^{90}\text{Y}$ $2.87 \cdot 10^3 \text{ s}^{-1}$ (Reg. 617) 3.7 s^{-1} (Reg. 634) 274 s^{-1} (Reg. 635) $1.43 \cdot 10^3 \text{ s}^{-1}$ (Reg. 637)	$\pm 3\%$ at 95% confidence level
	^{14}C 1.43 s^{-1} (Reg. 611)	$\pm 3\%$ at 95% confidence level
	^{36}Cl 1.41 s^{-1} (Reg. 680)	$\pm 3\%$ at 95% confidence level
Alpha standards	^{241}Am $1.787 \cdot 10^3 \text{ s}^{-1}$ (Reg. 613) $1.214 \cdot 10^3 \text{ s}^{-1}$ (Reg. 618) 340 s^{-1} (Reg. 619) 72.5 s^{-1} (Reg. 636)	$\pm 3\%$ at 95% confidence level

Availability:		
On receipt of order	[]	Details (eg frequency of batch processing, turn-round time)
By batch processing	[]	
By special arrangement	[]	

Quality Assurance: DNST facilities are not currently available for commercial use		
Is your service UKAS accredited? yes [] no [☒]		
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
A quality system meeting requirements of ISO 9001 (incorporating recommendations of ISO 10012-1) and MoD policy is operated for testing of portable and installed radiation monitors in DNST		
(b) traceability to national measurement standards (eg secondary standard instrument)		
Traceability via tertiary standards calibrated against secondary standards held by DRaStaC		

Signed: R B Manson	NAME : R B MANSON	Date: 20 December 1996
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Institute:	National Radiological Protection Board		
Address:	Radiation Metrology Group Chilton, Didcot, Oxon. OX11 0RQ		
Contact:	Duncan R McClure		
Telephone:	(01235) 822738	Fax: (01235) 833891	E-mail: duncan.mcclure@nrpb.org.uk

Description of Service:

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
Instrument evaluations	<u>X-radiation</u> 8.6 - 248 keV	See sheet LN - 02
Instrument calibrations, tests before use and periodic tests	<u>γ-radiation</u> 60 keV - 1.25 MeV	See sheet LN - 03
Type testing of instruments and personal dosimeters	<u>β-radiation</u> 0.2 - 2 MeV	See sheet LN - 04
Instrument and detector development for industry	<u>Neutron radiation</u> ²⁴¹ Am(Be) and ²⁵² Cf	See sheet LN - 05
Tertiary standards calibrations	<u>Contamination sources</u>	See sheet LN - 06
Calibration of personal dosimeters	β 0.15 - 2 MeV	
Performance tests on dosimetry services	α 5.5 MeV x 27 keV	

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time)
By batch processing	☐	
By special arrangement	☒	

Quality Assurance:		
Is your service UKAS accredited?	yes ☐	no ☒
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
NRPB Quality System		
(b) traceability to national measurement standards (eg use of secondary standard instrument)		
Calibration of secondary standards at NPL, and all associated equipment tested at NAMAS laboratories		

Signed:	<i>D R McClure</i>	NAME:	D R McCLURE	Date:	17 February 1998
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**Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1C**

Continuation Sheet

Description of Service (continued)

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>X-radiation</u> <u>ISO filtered Low, Narrow and Wide Series</u> Air kerma (Gy) Air kerma rate (Gy h^{-1}) Ambient and directional dose equivalent (Sv) Ambient and directional dose equivalent rate (Sv h^{-1})	<u>ISO Low 20%</u> 30 - 211 keV Approx air kerma rate range [†] 75 - 170 $\mu\text{Gy h}^{-1}$	$\pm 5\%$ at 95% confidence level
	<u>ISO Narrow 30%</u> 16.3 - 248 keV Approx air kerma rate range [†] 0.3 - 2.4 mGy h^{-1}	
	<u>ISO Wide 50%</u> 45 - 202 keV Approx air kerma rate range [†] 3 - 30 mGy h^{-1}	
	<u>ISO High (part)</u> 102 - 147 keV Approx air kerma rate range [†] 10 - 77 mGy h^{-1}	
	[†] Air kerma rate at 2m per mA	
	<u>ISO Fluorescence Series</u> Air kerma (Gy) Air kerma rate (Gy h^{-1}) Ambient and directional dose equivalent (Sv) Ambient and directional dose equivalent rate (Sv h^{-1})	
	<u>Energy range</u> 8.63 - 74.1 keV	
	<u>Kerma rate range[†]</u> 10 - 420 $\mu\text{Gy h}^{-1}$	
	[†] Air kerma rate at 2m per mA	

Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1C

Continuation Sheet

Description of Service (continued):

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Gamma-radiation</u>		
Air kerma (Gy)	60 keV ^{241}Am (1.1 $\mu\text{Gy h}^{-1}$ - 1.5 mGy h^{-1})	$\pm 3\%$ at 95% confidence level
Air kerma rate (Gy h^{-1})		
Ambient and directional dose equivalent (Sv)	662 keV ^{137}Cs (0.3 $\mu\text{Gy h}^{-1}$ - 50 mGy h^{-1})	
Ambient and directional dose equivalent rate (Sv h^{-1})	1.25 MeV ^{60}Co (2.4 $\mu\text{Gy h}^{-1}$ - 9 mGy h^{-1})	

Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1C

Continuation Sheet

Description of Service (continued):

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
<u>β-radiation</u> <u>Calibration of monitoring instruments</u> Absorbed dose rate to tissue (Gy h⁻¹) Absorbed dose rate to air (Gy h⁻¹)	¹⁴⁷Pm, ²⁰⁴Tl and ⁹⁰Sr/⁹⁰Y ¹⁴⁷Pm, ²⁰⁴Tl and ⁹⁰Sr/⁹⁰Y	± 10% at 95% confidence level

Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1C

Continuation Sheet

Description of Service (continued):

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
<u>Neutron radiations</u> MADE Ambient dose equivalent rate (Sv h⁻¹)	²⁴¹Am(Be) (α,n) 20 μSv h⁻¹ to 700 μSv h⁻¹ ²⁵²Cf 20 μSv h⁻¹ to 400 μSv h⁻¹	± 5% at 95% confidence level

Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1C

Continuation Sheet

Description of Service (continued):

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
<u>α, β and X-ray contamination measurements</u> Detection efficiency (traceable to emission rate)	<u>Energies</u> β 0.15 - 2MeV α 5.5 MeV x 27 keV	 ± 10% at 95% confidence level

Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Radiological Protection Board		
Address:	NRPB Scotland 155 Hardgate Road Glasgow G51 4LS		
Contact:	R Wheelton or B Thomson (service enquiries)		
Telephone:	0141 440 2201	Fax:	0141 440 0820
	E-mail: ron.wheelton@nrpb.org.uk		

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Gamma radiation Air kerma (Gy) Air kerma rate (Gy h ⁻¹)	²⁴¹ Am (60keV) 0.7 μ Gy h ⁻¹ - 50 μ Gy h ⁻¹ ¹³⁷ Cs (662 keV) 0.6 μ Gy h ⁻¹ - 2.9mGy h ⁻¹	$\pm$ 10 % at 95 % confidence level $\pm$ 5 % at 95 % confidence level
Contamination measurements α , β and low energy photon measurements	α 5.5 MeV β 0.15- 2.2MeV Photon 27 keV	$\pm$ 10 % at 95 % confidence level

Availability:	
On receipt of order ☒	Details (eg frequency of batch processing, turn-round time)
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
NRPB Quality System	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Amersham Int. standardised sources. All equipment used in the measurements has a calibration traceable to national standards directly through a NAMAS accredited laboratory	

Signed: R Wheelton	NAME: R WHEELTON	Date : 22 February 1999
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Radiological Protection Board		
Address:	NRPB Scotland 155 Hardgate Road Glasgow G51 4LS		
Contact:	R Wheelton or B Thomson (service enquiries)		
Telephone:	0141 440 2201	Fax: 0141 440 0820	E-mail: ron.wheelton@nrpb.org.uk

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Beta dose rate (Sv h ⁻¹)	⁹⁰ Sr/ ⁹⁰ Y 20 μ Sv h ⁻¹ - 5 mSv h ⁻¹	$\pm 10\%$ at 95 % confidence level
	²⁰⁴ Th 3 μ Sv h ⁻¹ - 0.6 mSv h ⁻¹	$\pm 10\%$ at 95 % confidence level

Availability:	
On receipt of order ☒	Details (eg frequency of batch processing, turn-round time)
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) NRPB Quality System	
(b) traceability to national measurement standards (eg secondary standard instrument) Amersham Int. standardised sources. All equipment used in the measurements has a calibration traceable to national standards directly through a NAMAS accredited laboratory	

Signed: R Wheelton	NAME: R WHEELTON	Date: 22 February 1999
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Radiological Protection Board		
Address:	Northern Centre Hospital Lane, Cookridge, Leeds LS16 6RW		
Contact:	Mrs J Shaw	E-mail: joanne.shaw@nrpb.org.uk	
Telephone:	0113 267 9041	Fax: 0113 261 3190	

Description of Service:

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Gamma radiation air kerma rate</u> Air kerma (Gy) Air kerma rate (Gy h ⁻¹) Ambient dose equivalent (Sv) * Ambient dose equivalent rate (μ Sv h ⁻¹) * * calculated using BCRU conversion coefficients	662 keV ¹³⁷ Cs 2.0 μ Gy h ⁻¹ - 30 mGy h ⁻¹ 60 keV ²⁴¹ Am 0.3 μ Gy h ⁻¹ - 40 μ Gy h ⁻¹	$\pm$ 10% at 95% confidence limits
<u>α, β, X-ray and e.c. surface contamination</u> Detection efficiency (traceable to emission rate)	α 5.5 MeV β 0.15 - 2 MeV e.c. 6 keV X-ray 30 keV	$\pm$ 10% at 95% confidence limits

Availability:	
On receipt of order	[x]
By batch processing	[]
By special arrangement	[x]
Turn-round within 10 working days of receipt of order (most within 5 w. day) Same day service by prior arrangement	

Quality Assurance:	
Is your service UKAS accredited?	yes [] no [x]
If not, please identify	
(a) quality system employed (eg ISO 9001, . . .)	
NRPB quality assurance system	
(b) traceability to national standards (eg use of secondary standard instrument)	
Air kerma rates: beams are calibrated using an instrument calibrated by NPL and held by the Metrology Department at NRPB Chilton	
Plaque emission rates: DKD calibration certificates held for each plaque.	
Intercomparison carried out regularly by the Metrology Department at NRPB Chilton.	

Signed:	Joanne Shaw	Name: Joanne Shaw	Date: 16 Jan 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Radiological Protection Board		
Address:	Southern Centre Chilton Didcot, Oxon, OX11 0RQ		
Contact:	Mr A Wright (Ext: 2675);	Service Enquiries: Mike Potter (Ext: 2685)	
Telephone:	01235 831600	Fax:	01235 822650
	E-mail: andrew.wright@nrpb.org.uk mike.potter@nrpb.org.uk		

Description of Service:

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
Gamma radiation Air kerma (Gy) Air kerma rate ($\mu\text{Gy h}^{-1}$) Ambient and directional dose equivalent (Sv) Ambient and directional dose equivalent rate (Sv h^{-1})	^{241}Am (60 keV) (0.2 $\mu\text{Gy h}^{-1}$ - 40 $\mu\text{Gy h}^{-1}$) ^{137}Cs (662 keV) (1.7 $\mu\text{Gy h}^{-1}$ - 33 mGy h^{-1})	$\pm 10\%$ at 95% confidence limit
α, β and x-ray contamination measurements Detection Efficiency (traceable to emission rate)	β - 0.15 - 2 MeV α - 5.5 MeV x-ray - 27 keV	$\pm 10\%$ at 95% confidence limit

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time) Same day service available by prior arrangement at no additional charge. Normal turnaround 10 days
By batch processing	☐	
By special arrangement	☒	

Quality Assurance:		
Is your service UKAS accredited?	yes ☐	no ☒
If not, please identify		
(a) quality system employed (eg ISO 9001, . . .) NRPB Quality System, NAMAS pending		
(b) traceability to national measurement standards (eg secondary standard instrument) Air kerma rate determined using ionisation chambers calibrated to secondary standard by the National Physical Laboratory		

Signed:	M Potter	Name:	M POTTER	Date:	10 Feb 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	National Radiological Protection Board		
Address:	Southern Centre Chilton Didcot, Oxon, OX11 0RQ		
Contact:	Mr A Wright (Ext: 2675);	Service Enquiries: Mike Potter (Ext: 2685)	
Telephone:	01235 831600	Fax:	01235 822650
		E-mail: andrew.wright@nrpb.org.uk mike.potter@nrpb.org.uk	

Description of Service:

Measured Quantity, Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
β dose rate Absorbed dose rate to tissue (Gy h^{-1}) Absorbed dose rate to air (Gy h^{-1}) [Note: β dose rate facility is provided by Radiation Metrology Group at NRPB, Chilton] For a limited number of instrument types the β dose rate response is derived from the instruments response to a large area ^{14}C source	0.2 - 2 MeV	$\pm 10\%$ at 95% confidence limit

Availability:	
On receipt of order	☒ Details (eg frequency of batch processing, turn-round time)
By batch processing	☐ Same day service available by prior arrangement at no
By special arrangement	☒ additional charge. Normal turnaround 10 days

Quality Assurance:	
Is service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	NRPB Quality System, NAMAS pending
(b) traceability to national measurement standards (eg secondary standard instrument)	Air kerma rate determined using ionisation chambers calibrated to secondary standard by the National Physical Laboratory

Signed:	M Potter	Name:	M POTTER	Date:	10 Feb 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	NE Technology Limited		
Address:	Bath Road Beenham READING RG7 5PR		
Contact:	Jen Barnes		
Telephone: 0118 971 2121	Fax: 0118 971 2835	E-mail: jen.barnes@netech.co.uk	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
X and γ dose and dose rate meters ISO 4037 ISO 8963	<u>ISO Narrow Series</u> 33 keV 118 keV 48 keV 161 keV 65 keV 205 keV 83 keV 248 keV 100 keV Range: typically 0.1 mGy/h to 1 mGy/h <u>ISO Wide Series</u> 45 keV 134 keV 58 keV 169 keV 79 keV 202 keV 104 keV Range: typically 1 mGy/h to 10 mGy/h	$\pm 5\%$ expressed at a confidence level of not less than 95%

Availability:		
On receipt of order	[✓]	Details (eg frequency of batch processing, turn-round time) 14 days
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:		
Is your service UKAS accredited?	yes []	no [✓]
UKAS accreditation being sought		
If not, please identify		
(a) quality system employed (eg ISO 9001, ...) ISO 9002 (1994)		
(b) traceability to national measurement standards (eg secondary standard instrument) Traceability via NPL secondary standard dosimetry systems		

Signed:	J Barnes	NAME:	J. BARNES	Date: 11 May 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	NE Technology Limited		
Address:	Bath Road Beenham READING RG7 5PR		
Contact:	Jen Barnes		
Telephone:	0118 971 2121	Fax:	0118 971 2835
		E-mail:	jen.barnes@netech.co.uk

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
Surface Emission Rate for extended area radioactive reference sources used in the calibration of contamination monitors ISO 8769	<u>Alpha</u> Americium-241 Natural Uranium <u>Beta</u> Carbon-14 Technetium-99 Cobalt-60 Caesium-137 Chlorine-36 Strontium-90/Yttrium-90 Emission rates to 10,000 s ⁻¹	± 3% except Caesium-137 ± 4% Cobalt-60 ± 5% All uncertainties are expressed at a confidence level of not less than 95%

Availability:		
On receipt of order	[✓]	Details (eg frequency of batch processing, turn-round time,) 14 days
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:	
Is your service UKAS accredited?	yes [] no [✓]
UKAS accreditation being sought	
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
ISO 9002 (1994)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Traceability by comparison against an NPL calibrated source of the same nuclide	

Signed:	J Barnes	NAME:	J. BARNES	Date:	11 May 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Institute:	NE Technology Limited		
Address:	Bath Road Beenham READING RG7 5PR		
Contact:	Jen Barnes		
Telephone:	0118 971 2121	Fax:	0118 971 2835
		E-mail:	jen.barnes@netech.co.uk

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Instruments used for the measurement of alpha and/or beta surface contamination	<u>Alpha</u> Americium-241 Natural Uranium <u>Beta</u> $E_{\max}$: 150 keV to 3.5 MeV Emission rates up to 10,000 s ⁻¹ (20 kBq) dependent upon detector sensitive area	$\pm 5\%$ expressed at a confidence level of not less than 95%

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time) 14 days
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
UKAS accreditation is being sought	
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO 9002 (1994)	
(b) traceability to national measurement standards (eg use of secondary standard instrument) Traceability via sources directly compared to NPL Class 1 secondary standards of same nuclide	

Signed:	J Barnes	NAME:	J. BARNES	Date:	11 th May 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Institute:	NE Technology Limited		
Address:	Bath Road Beenham READING RG7 5PR		
Contact:	Jen Barnes		
Telephone:	0118 971 2121	Fax:	0118 971 2835
		E-mail:	jen.barnes@netech.co.uk

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Beta Radiation dose rate for dose and dose rate meters ISO 6980	Strontium-90/Yttrium-90	$\pm 6\%$ Expressed at a confidence level of not less than 95%

Availability:	
On receipt of order ☒	Details (eg frequency of batch processing, turn-round time) 14 days
By batch processing ☐	
By special arrangement ☐	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO 9002 (1994)	
(b) traceability to national measurement standards (eg secondary standard instrument)	

Signed:	J Barnes	NAME:	J. BARNES	Date:	11 May 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	NE Technology Limited		
Address:	Bath Road Beenham READING RG7 5PR		
Contact:	Jen Barnes		
Telephone:	0118 971 2121	Fax:	0118 971 2835
	E-mail: jen.barnes@netech.co.uk		

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Gamma dose and dose rate meters	<u>Caesium-137</u> 1 μ Sv/h to 500 mSv/h	Caesium-137 and Cobalt-60 $\pm 3\%$
Personal Dosimeters; passive and active	<u>Cobalt-60</u> 15 μ Sv/h to 0.74 Sv/h	Americium-241 $\pm 4\%$
	<u>Americium-241</u> 20 μ Sv/h to 200 μ Sv/h	All uncertainties expressed at a confidence level of not less than 95%

Availability:		
On receipt of order	[✓]	Details (eg frequency of batch processing, turn-round time) 14 days
By batch processing	[]	
By special arrangement	[]	

Quality Assurance:		
Is your service UKAS accredited?	yes []	no [✓]
UKAS accreditation being sought		
If not, please identify		
(a) quality system employed (eg ISO 9001, ...) ISO 9002 (1994)		
(b) traceability to national measurement standards (eg use of secondary standard instrument) Traceability via NPL secondary standard dosimetry systems		

Signed:	J Barnes	NAME:	J. BARNES	Date: 11 May 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	MagneX Electric plc		
Address:	Radiation Metrology Group Berkeley Centre Berkeley, GLOUCS GL13 9PB		
Contact:	G S Wilkinson-Tough		
Telephone:	01453 812867	Fax:	01453 812112
E-mail:			

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Tritiated Nitrogen for calibration of tritium in air monitors	0.1 - 30 MBq m ³	$\pm 10\%$ at 95% confidence level

Availability:		
On receipt of order	☐	Details (eg frequency of batch processing, turn-round time) 14 Day Turnaround
By batch processing	☐	
By special arrangement	☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO 9001	
(b) traceability to national measurement standards (eg secondary standard instrument) Gas traceable to French national standard.	

Signed: G S Wilkinson-Tough	NAME: G S WILKINSON-TOUGH	Date: 18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Magnox Electric plc		
Address:	Radiation Metrology Group Berkeley Centre Berkeley, GLOUCS GL13 9PB		
Contact:	G S Wilkinson-Tough		
Telephone:	01453 81 2867	Fax:	01453 81 2112
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Surface Emission rate	<u>Plane beta sources:</u> ^{36}Cl : 30 - 10,000 $\beta \text{ s}^{-1}$ ^{14}C : 30 - 10,000 $\beta \text{ s}^{-1}$ $^{90}\text{Sr}/^{90}\text{Y}$: 30-10,000 $\beta \text{ s}^{-1}$ ^{55}Fe : 30 - 10,000 $\gamma \text{ s}^{-1}$ <u>Plane alpha sources:</u> ^{241}Am : 5 - 10,000 $\alpha \text{ s}^{-1}$	$\pm 10\%$ at 95% confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) 14 Day Turnaround
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service NAMAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO9001	
(b) traceability to national measurement standards (eg secondary standard instrument) Traceable to national standards via secondary standard instrument/sources	

Signed: G S Wilkinson-Tough	NAME: G S WILKINSON-TOUGH	Date: 18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Magnez Electric plc		
Address:	Radiation Metrology Group Berkeley Centre Berkeley, GLOUCS GL13 9PB		
Contact:	G S Wilkinson-Tough		
Telephone:	01453 81 2867	Fax:	01453 81 2112
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Neutron fluence or ambient dose equivalent rate	D - d accelerator: 2.7 MeV 70 mSv h ⁻¹	$\pm 10\%$ at 95% confidence level
	Am-Be: 5 x 10 ⁶ n s ⁻¹	$\pm 10\%$ at 95% confidence level
	Thermal: isotropic in 50 x 50 cm volume. 1.8 x 10 ⁴ n s ⁻¹ cm ⁻²	$\pm 15\%$ at 95% confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) 14 Day Turnaround
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO 9001	
(b) traceability to national measurement standards (eg secondary standard instrument) Traceable to national standards via secondary standard instrument. Thermal flux NPL calibrated.	

Signed: G S Wilkinson-Tough	NAME: G S WILKINSON-TOUGH	Date: 18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Magnox Electric plc		
Address:	Radiation Metrology Group Berkeley Centre Berkeley, GLOUCS GL13 9PB		
Contact:	G S Wilkinson-Tough		
Telephone:	01453 81 2867	Fax:	01453 81 2112
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Photon air kerma rate or ambient dose equivalent rate	X-rays: ISO low dose rate series; 30 - 211 keV	$\pm 5\%$ at 95% confidence level
	ISO narrow series; 33 - 205 keV 6 MeV photons	$\pm 10\%$ at 95% confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) 14 day turnaround
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO 9001	
(b) traceability to national measurement standards (eg secondary standard instrument) Traceable to national standards via secondary standard instruments	

Signed: G S Wilkinson-Tough	NAME: GS WILKINSON-TOUGH	Date: 18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Institute:	Magnox Electric plc		
Address:	Radiation Metrology Group Berkeley Centre Berkeley, GLOUCS GL13 9PB		
Contact:	G S Wilkinson-Tough		
Telephone:	01453 81 2867	Fax:	01453 81 2112
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Flow Rate (l min ⁻¹): Radioactive Particulate Air Monitor/Sampler	5 to 100 litre/min	$\pm 3\%$ at 95% confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) 14 Day Turnaround
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO 9001	
(b) traceability to national measurement standards (eg secondary standard instrument) Traceable to national standards via NAMAS calibrated flowmeters	

Signed: G S Wilkinson-Tough	NAME: G S WILKINSON-TOUGH	Date: 18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

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Institute:	Magneox Electric plc		
Address:	Radiation Metrology Group Berkeley Centre Berkeley, GLOUCS GL13 9PB		
Contact:	G S Wilkinson-Tough		
Telephone:	01453 81 2867	Fax:	01453 81 2112
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Surface contamination Instruments	<u>Alpha</u> ^{241}Am <u>Beta</u> ^{14}C ^{36}Cl ^{63}Ni $^{90}\text{Sr}/^{90}\text{Y}$ ^{147}Pm ^{60}Co ^{137}Cs <u>Photon</u> ^{129}I ^{55}Fe	$\pm 10\%$ at 95% confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) 14 Day Turnaround
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO 9001	
(b) traceability to national measurement standards (eg secondary standard instrument) Traceable to national standards via secondary standard instrument/sources	

Signed: G S Wilkinson-Tough	NAME: G S WILKINSON-TOUGH	Date: 18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Radiation Protection Service		
Address:	Worsley Mesdical and Dental Building University of Leeds Leeds LS2 9JT		
Contact:	Mr A G Richards		
Telephone:	0113-233 4203	Fax:	0113-233 4205
		E-mail:	a.g.richards@leeds.ac.uk

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Air kerma rate	^{137}Cs $1.0 \mu\text{Gy h}^{-1} - 50 \text{ mGy h}^{-1}$ ^{241}Am $1.0 - 200 \mu\text{Gy h}^{-1}$ ^{60}Co $1.0 - 5000 \mu\text{Gy h}^{-1}$	$\pm 10\%$ at 95% confidence level

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time) two - three days
By batch processing	☐	
By special arrangement	☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Secondary standard ionisation chamber to NPL	
Secondary standard sources traceable to PTB	

Signed: A Richards	NAME : A G RICHARDS	Date: 18 November 1993
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Radiation Protection Service		
Address:	Worsley Medical and Dental Building University of Leeds Leeds LS2 9JT		
Contact:	Mr A G Richards		
Telephone:	0113-233 4203	Fax: 0113-233 4205	E-mail: a.g.richards@leeds.ac.uk

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Surface emission rate	<u>Beta</u> ^{14}C ^{147}Pm ^{36}Cl $^{90}\text{S}/^{90}\text{Y}$ <u>Photon</u> ^{125}I	$\pm 12\%$ at 95% confidence level

Availability:	
On receipt of order [☒] By batch processing [☐] By special arrangement [☒]	Details (eg frequency of batch processing, turn-round time) two - three days

Quality Assurance:	
Is your service UKAS accredited? If not, please identify (a) quality system employed (eg ISO 9001, ...) (b) traceability to national measurement standards (eg secondary standard instrument) Secondary standard ionisation chamber to NPL Secondary standard sources traceable to PTB	yes [☐] no [☒]

Signed: A Richards	NAME : A G RICHARDS	Date: 18 November 1993
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	RRPPS		
Address:	PO Box 803 Edgbaston Birmingham B15 2TB		
Contact:	Denise Peach / Stuart Green / Jeff Palethorpe		
Telephone:	0121 627 2090/1	Fax:	0121 472 0393
		E-mail:	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Surface contamination instruments	Alpha: ^{241}Am	$\pm 5\%$ @ 95% confidence level
	Beta: ^{14}C	$\pm 5\%$ @ 95% confidence level
	^{60}Co	
	^{36}Cl	
	$^{90}\text{Sr}/^{90}\text{Y}$	
	Photon: ^{129}I	$\pm 10\%$ @ 95% confidence level

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time) 7 working days
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:		
Is service UKAS accredited?	yes ☐	no ☒
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
(b) traceability to national measurement standards (eg secondary standard instrument)		
Surface emission rates traceable to NPL and AWE, Aldermaston		

Signed:	D Peach	NAME: Ms D PEACH	Date: 1 January 1997
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	RRPPS		
Address:	PO Box 803 Edgbaston Birmingham B15 2TB		
Contact:	Denise Peach / Stuart Green / Jeff Palethorpe		
Telephone:	0121 627 2090/1	Fax:	0121 472 0393
		E-mail:	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty (±) with confidence limits
<u>Gamma radiation</u> Dose/dose rate instruments Air kerma rate Ambient & directional dose equivalent rate	²⁴¹ Am, 60 keV (6 µGy.h ⁻¹ - 0.7 mGy.h ⁻¹) ¹³⁷ Cs 662 keV (0.15 µGy.h ⁻¹ - 1.3 Gy.h ⁻¹)	± 6% at 95% confidence level

Availability:		
On receipt of order By batch processing By special arrangement	☒ ☐ ☐	Details (eg frequency of batch processing, turn-round time,...) 7 working days

Quality Assurance:		
Is your service UKAS accredited? If not, please identify (a) quality system employed (eg ISO 9001,...) (b) traceability to national measurement standards (eg secondary standard instrument) Traceable to NPL via secondary standard	Yes ☐	no ☒

Signed:	NAME: Ms D Peach	Date: 1 January 1997
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	RRPPS		
Address:	PO Box 803 Edgbaston Birmingham B15 2TB		
Contact:	Denise Peach / Stuart Green / Jeff Palethorpe		
Telephone:	0121 627 2090/1	Fax:	0121 472 0393
		E-mail:	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Beta radiation</u> Dose/dose rate instruments	<u>NPL jig</u> Approx: $^{90}\text{Sr}/^{90}\text{Y}$ - 9 mGy.h ⁻¹ ^{204}Tl - 1 mGy.h ⁻¹ ^{147}Pm - 2 mGy.h ⁻¹	 $\pm 4\%$ at 95% confidence level $\pm 4\%$ at 95% confidence level $\pm 10\%$ at 95% confidence level

Availability:		
On receipt of order	[☒]	Details (eg frequency of batch processing, turn-round time) 7 working days
By batch processing	[☐]	
By special arrangement	[☐]	

Quality Assurance:	
Is your service UKAS accredited?	Yes [☐] no [☒]
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Traceable to NPL	

Signed:	D Peach	NAME: Ms D PEACH	Date: 1 January 1997
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	RRPPS		
Address:	PO Box 803 Edgbaston Birmingham B15 2TB		
Contact:	Denise Peach / Stuart Green / Jeff Palethorpe		
Telephone:	0121 627 2090/1	Fax: 0121 472 0393	E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>X-radiation</u> Air kerma rate Protection level	ISO NARROW SPECTRA (33 - 248 keV) Typical air kerma value: 60 μ Gy/min at 1.2m and 1mA. ISO WIDE SPECTRA (45 - 79 keV)	<u>Air kerma dosimetry:</u> $\pm$ 5% at 95% confidence level

Availability:	
On receipt of order ☒ By batch processing ☐ By special arrangement ☐	Details (eg frequency of batch processing, turn-round time) 7 working days

Quality Assurance:	
Is service UKAS accredited? If not, please identify (a) quality system employed (eg ISO 9001, ...) (b) traceability to national measurement standards (eg secondary standard instrument) Air kerma values traceable to NPL via secondary standard instrument	Yes ☐ no ☒

Signed:	D Peach	NAME: Ms D PEACH	Date: 1 January 1997
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	RRPPS		
Address:	PO Box 803 Edgbaston Birmingham B15 2TB		
Contact:	Denise Peach / Stuart Green / Jeff Palethorpe		
Telephone:	0121 627 2090/1	Fax:	0121 472 0393
		E-mail:	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>X-radiation</u> <u>Mammographic qualities</u> Air kerma rate Peak kV Mammographic qualities	Mo anode + 30 μ m Mo filtration 25 - 35kVp @ approx. 3 mGy.s ⁻¹	Dosimetry: mammography qualities $\pm$ 4% at 95% confidence level Applied kV: mammography qualities $\pm$ 0.8kV at 95% confidence level

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time) 7 working days
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:	
Is service UKAS accredited?	Yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
End point of spectra determined by photon spectrometry & via NAMAS calibrated invasive kV meter. Air kerma values traceable to PTW via secondary standard instrument	

Signed:	D Peach	NAME: Ms D PEACH	Date: 1 Jan 1997
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	RRPPS		
Address:	PO Box 803 Edgbaston Birmingham B15 2TB		
Contact:	Denise Peach / Stuart Green / Jeff Palethorpe		
Telephone:	0121 627 2090/1	Fax:	0121 472 0393
		E-mail:	

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>X-radiation Diagnostic level</u>		
Air kerma rate	IEC 1267 "Medical Diagnostic x-ray equipment - Radiations conditions for use" RQR 3 - RQR9 up to 15 mGy.s ⁻¹	Air kerma $\pm$ 4% at 95% confidence level
Applied Peak kV	IEC1267 RQR3 - RQR9 50 - 120 kV (nominal)	Applied peak kilovoltage 1% at 95% confidence level

On receipt of order ☒ By batch processing ☐ By special arrangement ☐	Availability:
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Quality Assurance:	
Is service UKAS accredited? If not, please identify (a) quality system employed (eg ISO 9001, ...) (b) traceability to national measurement standards (eg secondary standard instrument) End point of spectra determined by photon spectrometry. Air kerma values traceable to PTW via secondary standard instrument.	Yes ☐ no ☒

Signed:	D Peach	NAME: Ms D PEACH	Date: 1 January 1997
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Radiation Protection Service		
Address:	Velindre NHS Trust Whitchurch Cardiff CF4 7XL		
Contact:	Mr D W Thomas	E-mail:	solutions@rpscardiff.co.uk
Telephone:	01222 615888	Fax:	01222 522694

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Testing of portable Radiation Monitoring Instruments as required by Regulation 24 of the Ionising Radiation Regulations 1985	^{137}Cs 2 $\mu\text{Gy}/\text{hour}$ to 8 mGy/hour ^{241}Am 5 $\mu\text{Gy}/\text{hour}$ to 400 $\mu\text{Gy}/\text{hour}$	

Availability:	
On receipt of order ☐ ☐ By batch processing ☒ ☒ By special arrangement ☒ ☒	Details (eg frequency of batch processing, turn-round time) Instrument returned within five working days

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Traceable to national standard via secondary standard instrument and NPL calibration	

Signed:	D W Thomas	NAME:	D W THOMAS	Date:	18 February 1998
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Ionising Radiations Metrology Forum
CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Radiation Protection Service		
Address:	Velindre NHS Trust		
	Whitchurch		
	Cardiff CF4 7XL		
Contact:	Mr D W Thomas		E-mail: solutions@rpscardiff.co.uk
Telephone:	01222 615888		Fax: 01222 522694

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Air kerma calibration of portable monitoring instruments (dose and doserate)	¹³⁷ Cs 2 μ Gy/hour to 8 mGy/hour	
	²⁴¹ Am 5 μ Gy/hour to 400 μ Gy/hour	

Availability:		
On receipt of order	[]	Details (eg frequency of batch processing, turn-round time) Instrument returned within five working days
By batch processing	[✓]	
By special arrangement	[✓]	

Quality Assurance:	
Is your service UKAS accredited?	yes [] no [✓]
If not, please identify	
(a) quality system employed (eg ISO 9001, . . .)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Traceable to national standards via secondary standard instrument and NPL calibration	

Signed:	D W Thomas	NAME: D W THOMAS	Date: 18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Radiation Protection Service		
Address:	Velindre NHS Trust		
	Whitchurch		
	Cardiff CF4 7XL		
Contact:	Mr D W Thomas	E-mail:	solutions@rpscardiff.co.uk
Telephone:	01222 615888	Fax:	01222 522694

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Air kerma calibration of measuring systems used in diagnostic radiology.	X-rays HVL (mm Al) 10.1 3.8 2.6 1.7 0.8 0.4 1 mGy/hour to 600 mGy/hour	

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time) Instrument returned within five working days
By batch processing ☒	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Traceable to national standards via secondary standard instrument and NPL calibration	

Signed:	D W Thomas	NAME :	D W THOMAS	Date:	18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Radiation Protection Service		
Address:	Velindre NHS Trust Whitchurch Cardiff CF4 7XL		
Contact:	Mr D W Thomas	E-mail:	solutions@rpscardiff.co.uk
Telephone:	01222 615888	Fax:	01222 522694

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Testing of portable Radiation Monitoring Instruments as required by Regulation 24 of the Ionising Radiation Regulations 1985 Surface emission rates	^{14}C ^{147}Pm ^{36}Cl $^{90}\text{S}/^{90}\text{Y}$ ^{125}I ^{137}Cs	$\pm 5\%$ at 95 % confidence level

Availability:	
On receipt of order ☐ By batch processing ☒ By special arrangement ☒	Details (eg frequency of batch processing, turn-round time)

Quality Assurance:	
Is your service UKAS accredited? If not, please identify (a) quality system employed (eg ISO 9001, ...) (b) traceability to national measurement standards (eg secondary standard instrument) Secondary standard ionisation chamber measurements traceable to NPL Secondary standard sources traceable to PTB	yes ☐ no ☒

Signed:	D W Thomas	NAME :	D W THOMAS	Date:	18 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	The Radiation Protection Centre		
Address:	St George's Hospital Blackshaw Road London SW17 0QT		
Contact:	David Arnold		
Telephone:	0181 725 1498	Fax:	0181 725 1052
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
X-ray air kerma in diagnostic energy range	50 - 150 kV using normal diagnostic X-ray intensities	$\pm 3\%$
X-ray air kerma in mammographic energy range	25 - 50 kV in the mammographic X-ray range	$\pm 3\%$

Availability:		
On receipt of order	☒	Details (eg frequency of batch processing, turn-round time)
By batch processing	☐	
By special arrangement	☐	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...) ISO 9002	
(b) traceability to national measurement standards (eg secondary standard instrument) Secondary standard traceable to PTB	

Signed: David Arnold	NAME : DAVID ARNOLD	Date: 30 December 1996
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	The Radiation Protection Centre		
Address:	St George's Hospital Blackshaw Road London SW17 0QT		
Contact:	David Arnold		
Telephone:	0181 725 1498	Fax:	0181 725 1052
		E-mail:	

Description of Service

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Calibration of non-invasive kVp dividers	50 - 150 kV in the diagnostic range 25 - 40 kV in the mammographic range	From $\pm 1.5\%$ to $\pm 2.8\%$

Availability:	
On receipt of order ☒	Details (eg frequency of batch processing, turn-round time)
By batch processing ☐	
By special arrangement ☐	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
ISO 9002	
(b) traceability to national measurement standards (eg secondary standard instrument)	
Secondary standard traceable to NPL	

Signed: David Arnold	NAME: DAVID ARNOLD	Date: 30 December 1996
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Northern Ireland Radiation Protection Service		
Address:	Forster Green Hospital 110 Saintfield Road Belfast BT8 4HD		
Contact:	Dr K Cranley	E-mail:	Kieran.Cranley@mpa.n-i.nhs.uk
Telephone:	01232 793681 x2390	Fax:	01232 703819

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Dose rate monitors Ambient dose equivalent rate	^{241}Am (60 keV) 1 $\mu\text{Sv/h}$ to 120 $\mu\text{Sv/h}$ ^{137}Cs (662 keV) 1 $\mu\text{Sv/h}$ to 15 mSv/h	$\pm 5\%$ at 95 % confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time)
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
NE Technology Secondary Standard dose-rate meter (3 litre ionisation chamber) calibrated at NPL	

Signed:	K Cranley	NAME:	Dr K CRANLEY	Date:	10 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Northern Ireland Radiation Protection Service		
Address:	Forster Green Hospital 110 Saintfield Road Belfast BT8 4HD		
Contact:	Dr K Cranley	E-mail:	Kieran.Cranley@mpa.n-i.nhs.uk
Telephone:	01232 793681 x2390	Fax:	01232 703819

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
Surface contamination monitors	Extended Area Reference Sources ^{14}C ^{204}Ti $^{90}\text{Sr}/\text{Y}$ ^{137}Cs ^{241}Am ^{125}I equivalent	$\pm 15\%$ at 95 % confidence level

Availability:	
On receipt of order ☐	Details (eg frequency of batch processing, turn-round time)
By batch processing ☐	
By special arrangement ☒	

Quality Assurance:	
Is your service UKAS accredited?	yes ☐ no ☒
If not, please identify	
(a) quality system employed (eg ISO 9001, ...)	
(b) traceability to national measurement standards (eg secondary standard instrument)	
NE Technology Secondary Standard dose-rate meter (3 litre ionisation chamber) calibrated at NPL	

Signed:	K Cranley	NAME:	Dr K CRANLEY	Date:	10 February 1998
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Ionising Radiations Metrology Forum

CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Medical Physics Department, St Thomas' Hospital		
Address:	Lambeth Palace Road London SE1 7EH		
Contact:	Mr. S Batchelor		
Telephone:	0171 922 8072	Fax: 0171 922 8279	E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Gamma Rays - Radionuclide Sources</u> Air kerma and air kerma rate; Ambient dose equivalent etc.	^{241}Am radionuclide gamma-ray source ^{137}Cs radionuclide gamma-ray source	$\pm 10\%$ at 95% confidence level

Availability:	
On receipt of order ☒ By batch processing ☐ By special arrangement ☒	Details (eg frequency of batch processing, turn-round time) 2 weeks turn-round except by special arrangement

Quality Assurance:	
Is your service UKAS accredited? If not, please identify (a) quality system employed (eg ISO 9001, ...) Calibrations carried out to ISO 9002 when ordered through Southern Scientific Ltd. Medical Physics Department is currently working towards ISO 9002 certification. (b) traceability to national measurement standards (eg secondary standard instrument) Gamma-ray dose rates traceable via protection level secondary standard instrument	yes ☐ no ☒

Signed:	S Batchelor	NAME:	S BATCHELOR	Date:	6 February 1998
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CALIBRATION/MEASUREMENT SERVICE DETAILS - IRMF(F)1

Please complete one form for each service, using typescript with black ink. Forms will be reproduced as supplied.

Institute:	Medical Physics Department, St Thomas' Hospital		
Address:	Lambeth Palace Road		
	London	SE1 7EH	
Contact:	Mr. S Batchelor		
Telephone:	0171 922 8072	Fax: 0171 922 8279	E-mail:

Description of Service:

Measured Quantity Instrument or Gauge	Range - include Energy and Intensity where appropriate	Best Measurement Capability expressed as an uncertainty ($\pm$) with confidence limits
<u>Standards of Radioactive Surface Contamination</u> Emission rate standards and instrument calibration	ISO beta-emitting large area source (max. > 0.15 MeV) Gamma-emitting large area source	$\pm 10\%$ at 95% confidence level for detector area up to 100 cm^2

Availability:		
On receipt of order	[✓]	Details (eg frequency of batch processing, turn-round time) 2 weeks turn-round except by special arrangement
By batch processing	[]	
By special arrangement	[✓]	

Quality Assurance:		
Is your service UKAS accredited?	yes []	no [✓]
If not, please identify		
(a) quality system employed (eg ISO 9001, ...)		
Medical Physics Department is currently working towards ISO 9002 certification.		
(b) traceability to national measurement standards (eg secondary standard instrument)		
(c) Large-area source activity traceable to PTW standard via DKD / Amersham calibration certificates		

Signed:	<i>S Batchelor</i>	NAME: S BATCHELOR	Date: 6 February 1998
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