

EURADOS IC2018ph

- 40 countries
- 101 IMS
- 121 systems
- 4114 dosimeters
- 1573 sheets of paper for certificate packs
- A lot of hard work & some good luck...

40: Albania; Austria; Bosnia and Herzegovina; Belgium; Bulgaria; Canada; Switzerland; Cyprus; Czech Republic; Germany; Denmark; Estonia; Spain; France; United Kingdom; Greece; Croatia; Hungary; Israel; India; Iraq; Italy; Japan; Lebanon; Lithuania; Luxembourg; Latvia; Montenegro; Macedonia, the former Yugoslav Republic of; Netherlands; Norway; Portugal; Romania; Serbia; Sweden; Slovenia; Turkey; Ukraine; United States; Kosovo;

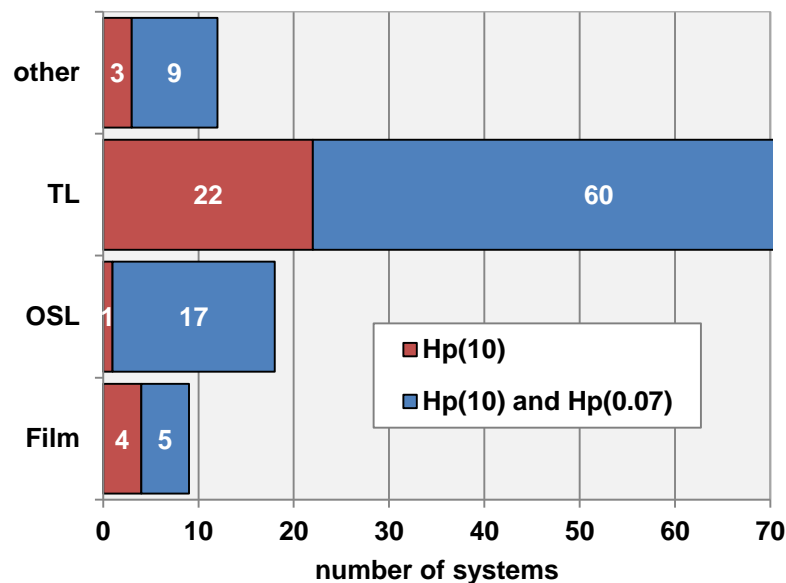


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Announcement - Call for participants	Feb 2018
*Registration of participants and systems	16 March 2018
Deadline for IMS sending application forms	13 April 2018
Deadline for IMS sending dosimeters to Coordinator	11 May 2018
Irradiations	June - August 2018
Coordinator sending dosimeters for readout	September 2018
Deadline for IMS sending dosimeters results to Coordinator	9 November 2018
Final results available	January 2019
IMS receiving certificates (121 posted 06 Feb)	February 2019

Dosimeter Types & Detectors

	systems	% of all	% of type
TL	82	68%	68%
LiF:Mg, Ti	47	39%	57%
Li2B4O7/CaSO4	15	12%	18%
LiF:Mg, Cu, P	13	11%	16%
TL - Other	7	6%	9%
other	12	10%	10%
DIS	7	6%	58%
RPL	4	3%	33%
APD	1	1%	8%
Film	9	7%	7%
agfa	7	6%	78%
FOMA	2	2%	22%
OSL	18	15%	15%
Al2O3:C	13	11%	72%
BeO	5	4%	28%
All	121	100%	100%



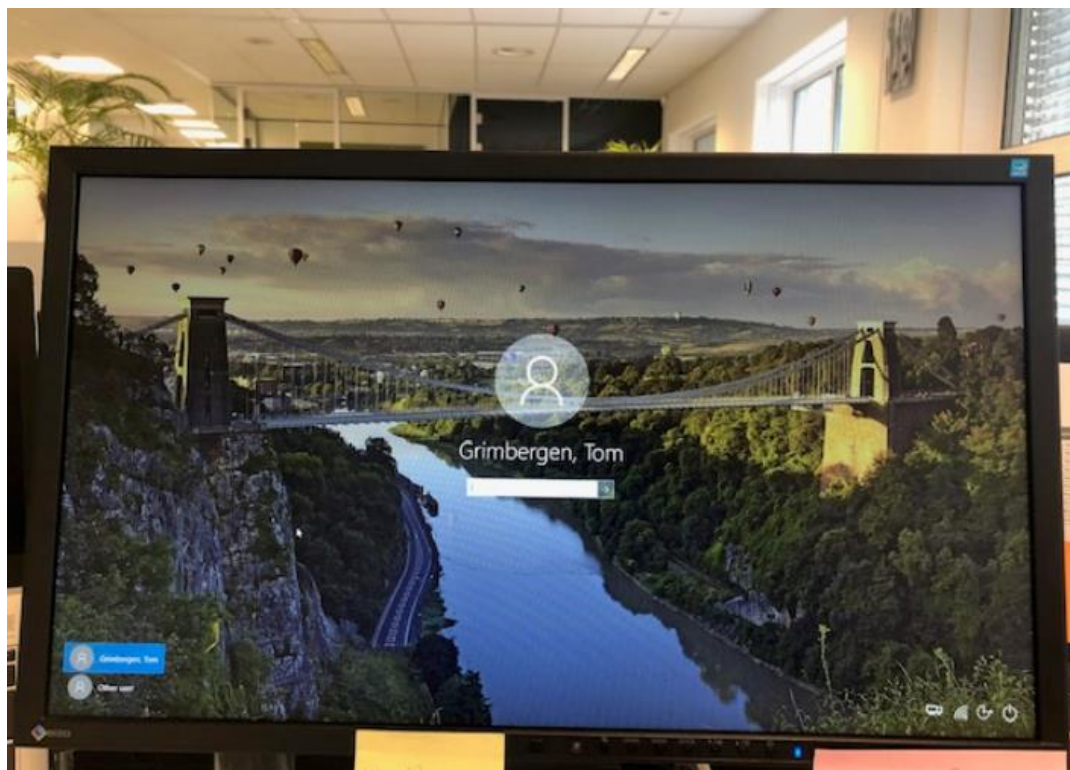
Irradiation Plan

Hp(10)		Dose (mSv)			dose-meter
Radiation	Quality	Mean	Min	Max	
X-Ray	N-60	1.5	1.3	1.7	242
	N-60/60°	1.5	1.3	1.7	242
	W-110	5.0	4.5	5.5	242
	N-150/60°	1.5	1.3	1.7	242
Gamma	S-Cs-S	0.8	0.7	1.0	242
	S-Cs-L	4.9	4.3	5.8	484
	S-Co-L	5.0	4.3	5.8	242
	S-Co-M	50	43	57	242
	S-Co-H	346	300	400	242
mixed	N-150/Cs-137	6.0	5.2	6.9	242
All		38.8	0.7	400.0	2662

Irradiation Plan

Hp(0.07)		Dose (mSv)			dose-meter
Radiation	Quality	Mean	Min	Max	
X-Ray	N-60	1.4	1.2	1.6	180
	N-60/60°	1.7	1.4	1.9	180
	W-110	4.6	4.1	5.0	180
	N-150/60°	1.6	1.3	1.8	180
Gamma	S-Cs-S	0.8	0.7	1.0	180
	S-Cs-L	4.9	4.3	5.7	360
	S-Co-L	5.2	4.4	5.9	180
	S-Co-M	51	44	58	180
	S-Co-H	349	305	407	180
mixed	N-150/Cs-137	5.7	5.0	6.7	180
All		39.1	0.7	407.0	1980

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Coincidence?

Tom's MS Windows

log in 07 Feb...

121 balloons flying
from Bristol...?

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A lot of people involved – this is a team effort !

- 101 IMS
- 3 coordinating staff + OG + Christian Gärtner
- 4 vans
- 2 irradiating laboratories
- + EURADOS admin Team
- ~ 250 persons...

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Berkeley 29 May 2018 - they are on their way - overland !!!



1 van direct to VSL
(13 dosemeters)

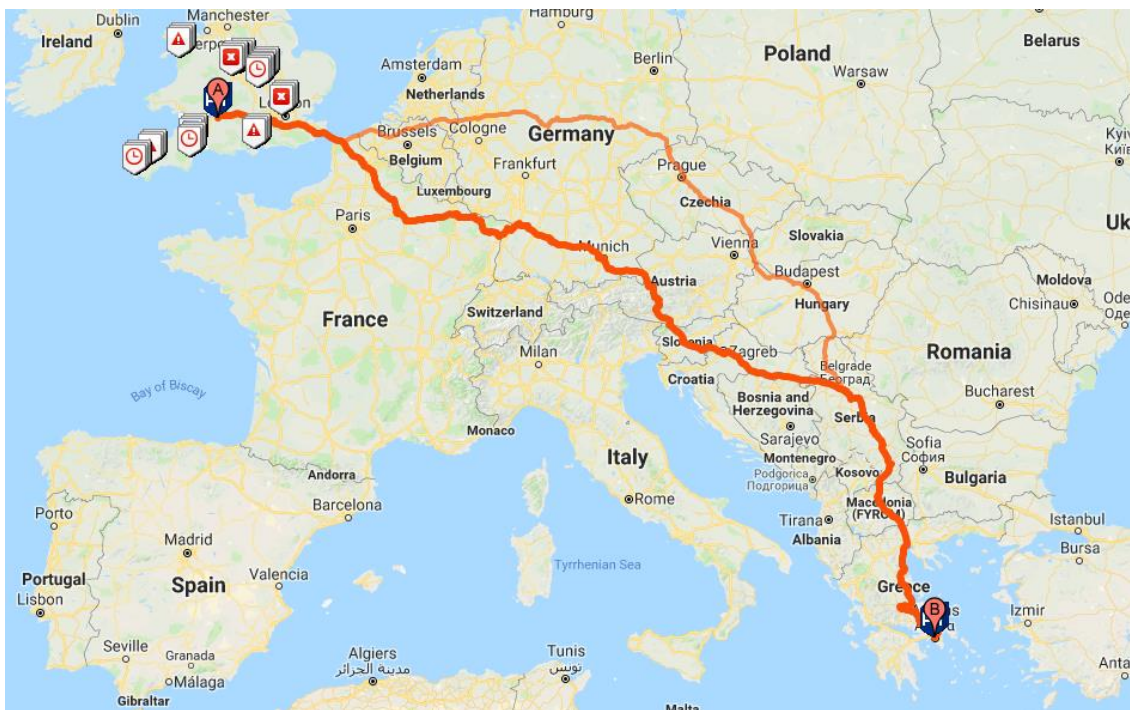
1 van direct to GAEC
(21 dosemeters)

5 spares for each lab

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to Frans at VSL & Argiro at GAEC – it's a very long way by van !



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Berkeley 08 August 2018 - they are back (this was a nice day – sunshine & the dosimeters safely returned !)



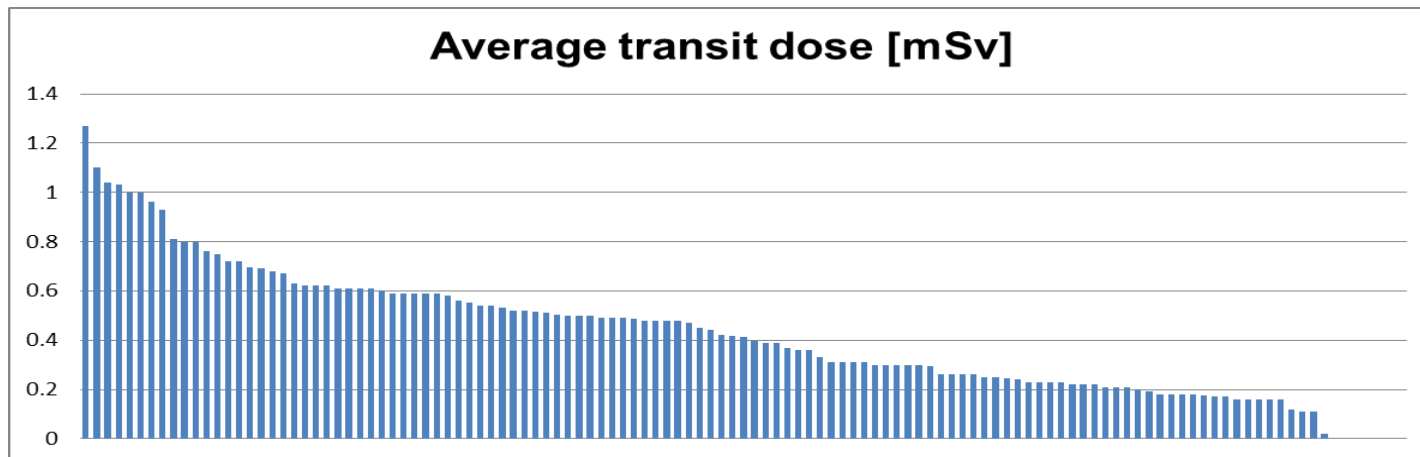
EPD Transit controls – coordinator to irradiating labs & return

All readings are in μSv

Crate #	EPD ID	Berkeley	GAEC	GAEC	Berkeley	No of days	Daily rate [$\mu\text{Sv/day}$]
		29-May-18	04-Jun-18	25-Jul-18	08-Aug-18		
GAEC 1	Blue 79978	0	8	69	87	71	1.23
GAEC 2	Grey 6022528	39	48	102	118	71	1.11

Crate #	EPD ID	Berkeley	VSL	VSL	Berkeley	No of days	Daily rate [$\mu\text{Sv/day}$]
		29-May-18	31-May-18	01-Aug-18	07-Aug-18		
VSL 1	Green 171 523	0	3	114	123	70	1.76
VSL 2	Blue 87199	0	2	113	121	70	1.73

Average transit dose information given by the participants shows that **47 out of 121 systems were X-rayed in transit**



Positive thing is the most of the institutes found their way to cope with this problem and achieved very good results.

There were a few problems...!



On receipt at
Berkeley
this box had
“**do not x-ray**”
stickers
on all 6 sides

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Someone added another sticker - TICK AFTER X-RAY



IMS sent
replacements
and we started
all over
again...

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- One consignment despatched back to IMS (after irradiations) was lost in transit – so much for courier tracking systems...!
- IMS sent a replacement batch
- All irradiations repeated (that was a bit of a rush...)

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- 37 non-EU participants
- Many thanks to our colleagues in Trade Control for organising pro-forma invoices and associated administration
- It's difficult to describe how complicated this can be !

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EURADOS European Radiation Dosimetry Group

Whole body dosimeter intercomparison IC2018ph

Certificate of Participation

EURADOS Intercomparison 2018 for whole body dosimeters (IC2018ph)

Certificate Number: EURADOS-2018-S009/2018 for system S009/2018
Number of pages: 4
Date of Issue: January 15, 2019
Participating Institute: Berkeley Approved Dosimetry Service, United Kingdom
Dosimetry System: ADS120
Reporting number: 28 (this anonymous number will be used in further publications)
Intercomparison procedure: The EURADOS Intercomparison 2018 for whole body dosimeters was managed and coordinated on behalf of EURADOS by the WG2 Intercomparison Organization Group (IG). The IG established the irradiation plan and announced the intercomparison, including the range limits of the doses and radiation qualities, in February 2018.
 The IC2018ph on-line platform (IOP) was used by the participants for registration and for all data transfer between the participants and the IG Coordinator. Participants were required to provide details of their dosimeters (including the dosimeter reference point) on the IOP. The participants then sent their dosimeters to the Coordinator (May 2018). The Coordinator checked the correct labelling of the dosimeters and transferred all dosimeters, along with the technical details provided by the participants, to the two irradiation laboratories. The dosimeters were irradiated according to the irradiation plan and returned to the Coordinator (September 2018).
 The Coordinator then returned the dosimeters to the participants and indicated which dosimeters had not been irradiated. The participants were instructed to follow normal routine procedures as far as possible. The participants then sent the results of the dosimeter readings to the Coordinator (November 2018). After receipt of all the participants' results, the Coordinator sent the appropriate irradiation data to each participant.
Number of participants: 101 institutes participated in IC2018ph with a total of 121 systems.
Coordinator: A McWhan, W Dobrzynska, S Eliassik (Cavendish Nuclear Ltd., Berkley ADS, Berkeley, G13 9FB Gloucestershire, United Kingdom)
Intercomparison results: See the table on pages 2 to 4 of this certificate.
Irradiation data: See the attached certificate of the irradiation laboratories No. 3320722-S009/2018 and DOS 2107-S009/2018
Participant results: See the attached signed dose report provided by the participant.

On behalf of the intercomparison
Organization Group:

Andrew McWhan

Andrew McWhan
Coordinator

On behalf of EURADOS:

Werner Rühm

Werner Rühm
Chairperson

European Radiation Dosimetry Group e.V., D-85764 Neuherberg

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EURADOS European Radiation Dosimetry Group

Whole body dosimeter intercomparison IC2018ph

Result of the Intercomparison IC2018ph (Dosimetry System S009/2018)

EURADOS Dosimeter ID	Participant's Dosimeter ID	Radiation Quality	Quantity	Participant's Value	Reference Value	Ratio
S009/2018-4	62358	Co-60	$H_p(10)$	45.769 mSv	47.000 mSv	0.97
			$H_p(0.07)$	49.020 mSv	47.800 mSv	1.03
S009/2018-15	62895	Co-60	$H_p(10)$	47.254 mSv	47.000 mSv	1.01
			$H_p(0.07)$	49.147 mSv	47.800 mSv	1.03
S009/2018-24	65731	Co-60	$H_p(10)$	373.580 mSv	360.000 mSv	1.04
			$H_p(0.07)$	403.942 mSv	366.000 mSv	1.10
S009/2018-30	66968	Co-60	$H_p(10)$	5.193 mSv	5.800 mSv	0.90
			$H_p(0.07)$	5.620 mSv	5.900 mSv	0.95
S009/2018-33	65273	Co-60	$H_p(10)$	5.323 mSv	5.800 mSv	0.92
			$H_p(0.07)$	5.907 mSv	5.900 mSv	1.00
S009/2018-34	71991	Co-60	$H_p(10)$	352.078 mSv	360.000 mSv	0.98
			$H_p(0.07)$	389.028 mSv	366.000 mSv	1.06
S009/2018-2	66777	Cs-137	$H_p(10)$	5.170 mSv	5.100 mSv	1.01
			$H_p(0.07)$	5.111 mSv	5.100 mSv	1.00
S009/2018-3	65835	Cs-137	$H_p(10)$	4.877 mSv	5.100 mSv	0.96
			$H_p(0.07)$	5.123 mSv	5.100 mSv	1.00
S009/2018-11	61939	Cs-137	$H_p(10)$	4.149 mSv	5.100 mSv	0.81
			$H_p(0.07)$	5.422 mSv	5.100 mSv	1.06
S009/2018-16	63434	Cs-137	$H_p(10)$	4.708 mSv	5.100 mSv	0.92
			$H_p(0.07)$	5.111 mSv	5.100 mSv	1.00

Radiation Qualities and average photon energy (according to ISO 4037-1):

- **Gamma Radiation:**
 - S-Cs: 662 keV
 - S-Co: 1250 keV
- **X-Rays:**
 - N-60: 48 keV
 - W-110: 79 keV
 - N-150: 118 keV

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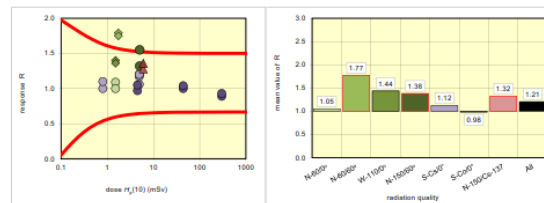
Reporting number 16: (OSL) for dose quantity Hp(10)

		true values reported by the irradiating laboratory		values reported by participants		results	
		dosemeter number	dose $H_p(10)$ mSv	dose $H_p(10)$ mSv	response R (reported/true)		
x ray	N 4070*	14	1.51	1.65	1.09	OK	
		9	1.51	1.51	1.00	OK	
	N 4070*	10	1.73	3.11	1.79	outlier	
		8	1.73	3.03	1.75	outlier	
	W 1100*	25	5.00	6.59	1.32	OK	
		28	5.00	7.77	1.55	outlier	
gamma	N 15040*	14	1.51	2.11	1.40	OK	
		32	1.51	2.05	1.36	OK	
	S Co 510*	31	0.80	0.80	1.00	OK	
		26	0.80	0.88	1.10	OK	
	S Co L10*	11	4.90	5.20	1.06	OK	
		6	4.90	5.76	1.17	OK	
mixed	S Co L10*	2	4.90	5.89	1.20	OK	
		4	4.90	5.89	1.20	OK	
	S Co L10*	22	4.50	4.39	0.97	OK	
		29	4.50	4.73	1.05	OK	
	S Co M10*	24	44.00	44.22	1.00	OK	
		20	44.00	45.70	1.04	OK	
N 150/Cs 137	S Co H10*	13	300.00	265.53	0.89	OK	
		18	300.00	273.60	0.91	OK	
		13	0.00	7.67	1.28	OK	
		12	0.00	8.14	1.36	OK	
		1		0.48			
		3		0.43			
		5		0.41			
		7		0.44			
		15		0.40			
		16		0.44			
	17		0.33				
	21		0.37				
	23		0.41				
	27		0.44				
	30		0.35				
	34		0.66				

Legend: NR - not irradiated; W - wrongly irradiated; * - special; L - low; M - medium; H - high dose

radiation quality	number of values	median (B)	mean (B)	maximum (B)	minimum (B)	coefficient of variation (B)
N 4070*	2	1.05	1.05	1.09	1.00	4%
N 4070*	2	1.77	1.77	1.79	1.75	2%
W 1100*	2	1.44	1.44	1.55	1.32	11%
N 15040*	2	1.38	1.38	1.40	1.36	2%
S Co 510*	6	1.14	1.12	1.20	1.00	7%
S Co L10*	6	0.90	0.88	1.05	0.89	4%
N 150/Cs 137	2	1.32	1.32	1.30	1.28	4%
All	22	1.14	1.21	1.79	0.89	21%

outliers: 3 of 22 Fraction of outliers: 14%



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- Appeals procedure - 10 appeals
- “Change of results after distribution of the irradiation data is only possible in case of errors made by the irradiation lab or intercomparison organization (to be judged by the intercomparison Organization Group).”
- Where irradiations were challenged, the irradiating laboratories were asked for verification.
- The Organization Group (OG) convened to discuss all participant appeals in advance of the issue of the IC2018ph certificates. ***The identities of the participants are known only to the Coordinating Team and are not revealed to the OG for these discussions.***
- Only one appeal was accepted - wrong irradiation

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A very big thank you to

- Coordinating Team (Wioletta & Sylwia)
- OG & Christian Gärtner
- VSL & GAEC
- All 101 participating IMS
- We hope you all choose to participate again !