

EURADOS General Assembly (AM2016)
Politecnico di Milano, February 10, 2016

– WG7 “INTERNAL DOSIMETRY” –
Network, Research, Dissemination of knowledge
M.A. Lopez (CIEMAT, Spain)



WG7 “INTERNAL DOSIMETRY” Network

- ✓ **Chairperson:** Maria Antonia Lopez (CIEMAT, Spain)
- ✓ **Secretary:** Augusto Giussani (BfS, Germany)
- ✓ **Task-coordinators:** D. Nosske, BfS (7.2/7.3), D. Franck, IRSN & AL Lebacq, SCK-CEN (7.4), E. Blanchardon, IRSN (T.5), G. Etherington, PHE (7.6), W. Hofmann, Univ. Salzburg & W. Li, HMGU (7.7) and M.A. Lopez CIEMAT & A. Giussani, BfS (7.8)

✓ **35 Full members**

✓ **63 Corresponding members**

✓ **37 institutes of 21 countries Europe, America and Asia**



✓ **Link with ICRP:** D. Nosske, G. Etherington, A. Giussani, E. Blanchardon, James W.Marsh

✓ **Link with ISO:** P. Bérard, CEA

✓ **Link with USTUR (DOE, USA):** S. Tolmachev, USTUR

✓ **Link with WHO REMPAN:** C. Li, Health Canada

✓ **Link with IAEA:** R. Cruz-Suarez



WG7 BUDGET 2015: WG7 meetings. 11000 € + TECHREC budget

<i>Date</i>	<i>Topic and Location of the meeting</i>	<i>N° participants</i>	<i>Costs (€)</i>
February 2015	AM2015, WG7 (plenary) meeting + TECHREC meeting. Dubrovnik,	31	6000 WG7+ TECHREC
April 2015	TECHREC meeting IM2015, Bruges, Belgium	11	<i>TECHREC Budget</i>
July 2015	TECHREC meeting CIEMAT, Madrid, Spain	11	<i>TECHREC Budget</i>
September 2015	WG7 (plenary) + TECHREC Meeting SSM, Stockholm, Sweden	30	5000 WG7+ TECHREC
October 2015	Task-group 7.2/7.3 meeting CEA, Saclay, France	4	300
November 2015	WG6 meeting (+ Task 7.7) IRSN, Fontenay-aux-Roses, France	1	500
February 2016	AM2016, WG7 (plenary) meeting + TECHREC meeting. Milano, Italy	40	6000
February 2016	TECHREC meeting. KIT, Karlsruhe, Germany	11	<i>TECHREC Budget</i>
September 2016	WG7 meeting, Oxford, UK 1st Europ. Radiat. Protection Week	30	

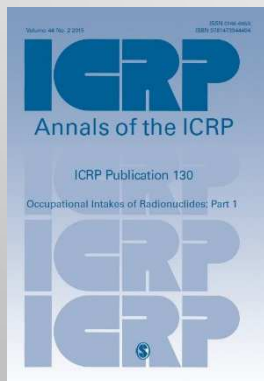
WG7 “Internal Dosimetry” WORK PLAN – 2016

- **Task 7.2./7.3–** Implementation and QA of Biokinetic Models.
D. Nosske (BfS, Germany).
- **Task 7.4.–** Individual Monitoring and application of Monte Carlo methods to in-vivo monitoring. Radiological and Nuclear emergencies.
D.Franck / A.L.Lebacq (SCK-CEN)
✓ Cathymara Project, 2015–2017 (Chair: D. Broggio, IRSN, France)
- **Task 7.5.–** Uncertainty on Dose Assessments – E. Blanchardon (IRSN, Fr)
- **Task 7.6.–** Training on Internal Dosimetry G. Etherington (PHE, UK).
✓ TECHREC Project, May 2014–2016 (Chair: G. Etherington, PHE, UK)
- **Task 7.7.–** Internal Microdosimetry. Collaboration with WG6 “Computational Dosimetry”
W. Hofmann (Univ. Salzburg, Austria) / W. Li (HMGU, Germany)
- **Task 7.8.–** Biodosimetry in case of accidental internal exposures. (WG10+WG7).
M.A. Lopez (CIEMAT, Spain) / A. Giussani (BfS, Germany)

WG7 “Internal Dosimetry” WORK PLAN

- **Task 7.1.– Update of IDEAS Guidelines.–** CM. Castellani (ENEA, Italy)
 - ✓ IM2015 (Castellani et al) Rad Prot Dosimetry (2015) doi:10.1093/rpd/ncv457
 - ✓ EURADOS Report 01–2013, translation to Spanish (SEPR, 2016)
 - ✓ **NEW:** EURADOS Intercomparison on Dose Assessments – when? *to be discussed* after publication of TECHREC and ICRP/OIR Reports

- **Task 7.2 / 7.3 – Implementation and QA of Biokinetic Models.** D. Nosske, BfS (Germany)
 - ✓ **ICRP OIR (Occupational Intakes of Radionuclides) Reports I,II, III, IV, V**
 - **OIR, Part I: ICRP130 (2015)** www.icrp.org
ICRP Publication 130. Occupational Intakes of Radionuclides: Part 1. Ann. ICRP 44(2), 2015. F. Paquet, G. Etherington, M.R. Bailey, R.W. Leggett, J. Lipsztein, W. Bolch, K.F. Eckerman, J.D. Harrison
 - **NEW:** Task–group on Guidance on the implementation of ICRP OIR Models. H–3, Cs,... **EURADOS Report –2017**
 - ✓ **Improving the CONRAD DTPA therapy model.** Meeting at CEA Oct–2015
 - A. Giussani/M. Kastl (HMGU and BfS, Germany) + CEA (France)



WG7 “Internal Dosimetry” WORK PLAN

➤ Task 7.4.- Individual Monitoring and Application of Monte Carlo Methods to in-vivo monitoring

Coordination: D. Franck (IRSN,France) / A.L. Lebacq (SCK-CEN,Belgium)

(I) In-vivo Intercomparison of ^{241}Am in 3 Skull phantoms (2011-2014) – END

- Coordination: P. Nogueira (HMGU, Germany) . Radiation Measurements (2015)

EURADOS YOUNG SCIENTIST AWARD 2015 (AM2016)

- Annual Meeting of the Health Physics Society 2016.

USTUR Session, Spokane (WA, USA). July 2016. M.A. Lopez (CIEMAT, Spain)

(II) Monte Carlo simulation of in-vivo monitoring of ^{241}Am in Voxel Skull Phantoms using Ge detectors. Joint WG7-WG6 Action – END -

- Coordinator: T. Vrba (CTU-Prague)

BEST POSTER AWARD IM2015

WG7 “Internal Dosimetry” WORK PLAN

Task 7.4.- Cont.

(III) EURADOS Survey on in-vivo monitoring data of exposed foreigners in Japan, obtained in their respective countries at early stage after the nuclear accident of Fukushima Daiichi NPP. – END



M.A. Lopez, D. Franck, P. Fojtik, J. Osko

- IAEA2014 – International Conference on Fukushima NPP accident, Feb-2014
- EURADOS AM2015. Winter School, Dubrovnik, Feb-2015 (www.eurados.org)
- RENEB2015 Biodosimetry Network (ISS, Rome, Italy) 2015
- IM2015 (Lopez et al.) Rad Prot Dosimetry (2015) doi:10.1093/rpd/ncv510
- IRPA 2016, Cape Town, Southafrica: **EARLY MEASUREMENTS OF GENERAL PUBLIC AFTER THE FUKUSHIMA DAIICHI NPP ACCIDENT: DATA MADE AVAILABLE TO THE EURADOS SURVEY.** P. Fojtik, D. Franck, M.A. Lopez, J. Oško

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➤ Task 7.4 (cont.)

- ✓ OPERRA (EC FP7) Call: CAThyMARA Project (2016–2018) APPROVED

Chair: D. Broggio (IRSN, France)

NEW

- Child and Adult Thyroid Monitoring After Reactor Accident
- Kick-off meeting at IRSN in January 2016

- ✓ LLNL (USA)/EURADOS Thyroid Radioiodine Monitoring Program (TRIP)

D. Hickman/Lori Collins (LLNL) & D. Franck /M.A. Lopez (EURADOS)

NEW

IAEA/ANSI thyroid calibration neck phantom and NIST-traceable isotopes for ^{125}I and ^{131}I

- 21 participants (17 Europe, 2 Asia, 2 America) March-2016

- ✓ EURADOS Report: Monte Carlo Applications to in-vivo monitoring of radionuclides.
Coordination: T. Vrba, CTU-Prague (WG6+WG7)

NEW

- EURADOS Intercomparisons: Knee, USTUR Leg, Lungs, Skull
- EURADOS/KIT Training Course



Figure 1- Neck phantom with thyroid phantom

Figure 2- Three thyroid phantom bottles

WG7 “Internal Dosimetry” WORK PLAN

➤ Task 7.5.– Uncertainties on dose assessments

Coordinator: E. Blanchardon (IRSN)

NEW Dosimetry of workers addressed in connection with epidemiology studies.

Objective: In the frame of an epidemiological study of occupational exposure to uranium, to validate the dose assessment protocol, to identify sources of uncertainty, and to discuss the assessment of uncertainty on dose.



- ✓ Exercise: to calculate lifetime doses for 3 uranium workers (deadline 30/6/15)
 - Main objective: to review different approaches of the dose assessment process in order to feed the discussion on the assessment of dosimetric uncertainties.
 - To reveal items missed in the dosimetry protocol of CURE Project to try to improve it in future projects.

WG7 “Internal Dosimetry” WORK PLAN

➤ Task 7.6.– Training on Internal Dosimetry . TECHREC Project Coordinator: G. Etherington (PHE, UK)

- TC “Fundamentals of internal dosimetry” – **postponed**
- EURADOS-KIT TC on Monte Carlo calibration of WBC, 2014
 - IM2015 (Breustedt et al.) Rad. Protect. Dosimetry 2016
 - *New edition of the course? To be discussed*



✓ TECHREC Project: “Establishment of Technical Recommendations for Monitoring Individuals for Occupational Intakes of Radionuclides” – EC DG ENER (2014–2016)

- Project Leader: George Etherington (PHE, UK)
- IM2015 (Etherington et al) Rad Protect Dosimetry 2015 doi:10.1093/rpd/ncv395
- Presentation of TECHREC at Art 31 Group of Experts meeting, Luxembourg Nov-2015
- 2nd Consultation Draft sent for comments on December-2015
- Final TECHREC EC Report: May 2016. Available (open access) by the end of 2016¹⁰

WG7 “Internal Dosimetry” WORK PLAN

➤ Task 7.7.– Internal Microdosimetry

Coordination: W. Hofmann (Univ. Salzburg, Austria) / W. Li (HMGU, Germany)

- Collaboration with WG6 “Computational Dosimetry” – TG– Micro and Nano dosimetry Joint meeting in Paris (November 2016)
- Application of computational nanodosimetry to gold nanoparticles in diagnosis and therapy
- Microdosimetry of inhaled alpha emitters at low doses
- **Balasz Mada (MTA-EK)** – Microdosimetry of alpha-particles emitted by radon progeny for modelling the induction of mutations and hyperplasia in the bronchial epithelium

EURADOS YOUNG SCIENTIST AWARD 2015 (AM2016)

– * CONCERT CALL, TOPIC 1

EURADOS WG7 – Internal Dosimetry

➤ Task 7.8.– Biodosimetry in case of accidental internal exposures

Coordination/Editorial team: WG10: H. Romm (BfS) / A. Testa (ENEA)
WG7: M.A. Lopez (CIEMAT) / A. Giussani (BfS)

- Review on the use of biodosimetry methods and internal dosimetry evaluations in scenarios involving internal exposures. 10 case scenario studies.
- Publication in process – 1st draft was discussed in Milano
 - ✓The contact persons of each case (1 WG10 & 1 WG7) will be contacted for agreement in the content of the manuscript
 - ✓Final revision by all WG10/WG7 participants of this joint study: summer 2016

Preliminary conclusions and gaps:

- Proper dosimetric quantities are required to be compared with the biological endpoints
- Special models must be developed for reliable blood dosimetry, to determine the blood dose and to know how this quantity correlates with the information provided by biological assays.
- **Clinic studies:** experiments can be conducted in cooperation with nuclear medicine units (e.g. ENEA Study – A. Testa)

EURADOS WG7 – Internal Dosimetry

➤ NEXT WG7 MEETING:

- **Radiation Protection Week:** September, 20–23, 2016. Oxford, UK
Contact person: Simon Bouffler (PHE, UK)



- ✓ *In the light of greater integration of European research on Radiation Protection demonstrated by the CONCERT European Joint Programme, the RPW2016 will be organized on 19–23 September in Oxford, UK.*
- ✓ *The meeting will bring together complementary strands of radiation protection research, with the established European platforms MELODI, EURADOS, NERIS and ALLIANCE as co-organisers, along with other relevant areas.*

- EURADOS WG7 meeting: 19 September 2016

EURADOS WG7 – Publications 2015 (1)

1.- PARAMETER UNCERTAINTY ANALYSIS OF A BIOKINETIC MODEL OF CAESIUM

W. B. Li, W. Klein, E. Blanchardon, M. Puncher, R.W. Leggett, U. Oeh, B. Breustedt, D. Noßke, M. A. Lopez. *Radiat. Prot. Dosim.* 163, 37–57 (2015)

2.- LESSONS LEARNED FROM THE EURADOS SURVEY ON INDIVIDUAL MONITORING DATA AND INTERNAL DOSE ASSESSMENTS OF FOREIGNERS EXPOSED IN JAPAN FOLLOWING THE FUKUSHIMA DAIICHI NPP ACCIDENT.

M. A. Lopez, P. Fojtik, D. Franck, J. Osko, U. Gerstmann, C. Scholl, A.L. Lebacq, B. Breustedt, L. del Risco Norrid. *Radiat. Prot. Dosim.* doi:10.1093/rpd/ncv510(2015)

3.- TECHNICAL RECOMMENDATIONS FOR MONITORING INDIVIDUALS FOR OCCUPATIONAL INTAKES OF RADIONUCLIDES.

G. Etherington, P. Bérard, E. Blanchardon, B. Breustedt, CM Castellani, C. Challethosn de Vathaire, A. Giussani, D. Franck, M.A. Lopez, J.W. Marsh, D. Nosske. *Radiat. Prot. Dosim.* doi:10.1093/rpd/ncv395 (2015)

4.- EURADOS-IDEAS GUIDELINES (VERSION 2) FOR THE ESTIMATION OF COMMITTED DOSES FROM INCORPORATION MONITORING DATA.

CM Castellani, J.W. Marsh, C. Hurtgen, E. Blanchardon, P. Bérard, A. Giussani, M.A. Lopez, *Radiat. Prot. Dosim.* doi:10.1093/rpd/ncv457(2015)

EURADOS WG7 – Publications 2015 (2)

5.- EURADOS ^{241}Am skull measurement intercomparison

P. Nogueira, W. Rühm, M.A. Lopez, T. Vrba, RW. Buchholz, P. Fojtik, G. Etherington, D. Broggio, J. Huikari, O. Marzocchi, D. Leone, J. Scott, A. Shutt, B. Hauck, K. Capello, B. Perez, JF Navarro S.Y. Tolmachev. **Radiation Measurements (2015)**

6.- EURADOS intercomparison exercise on MC modelling for the in-vivo monitoring of Am-241 in skull phantoms (Part II and III). Vrba Tomas, Broggio

David, Caldeira Margarida, Capello Kevin, Fantinova Karin, Franck Didier, Gomez-Ros, Jose Maria, Hunt John, Kinase Sakae, Leone Debora, Lombardo Pasquale Alessandro, Manohari Murugan, Marzocchi Olaf, Moraleda Montserrat, Nogueira Pedro, Oško Jakub, Arron Shutt, Suhl Soheigh, Takahashi Masa, Teles Pedro, Tremblay Marilyn, Tymińska Katarzyna, Lopez Maria Antonia, Tanner Rick. **Radiation Physics and Chemistry 113 (2015)**

7.- Counting ^{241}Am in the BfS Human skull Phantom on contact –

Evaluation in the Human Monitoring Laboratory. C. Li, P. B. Hauck, K. Capello, P. Nogueira, M.A. Lopez, G.H. Kramer. **Health Physics (2015)**

THANKS FOR YOUR ATTENTION !