

Impact of the new BSS in the Spanish radon program

**Luis S. Quindos Poncela, Carlos Sainz Fernandez,
Jose Luis Gutierrez, Ismael Fuente Merino**



International Radon Symposium 2013
Springfield, Illinois
September 22 – 25

Where we are ...



GRUPO RADÓN

Facultad de Medicina
Avda. Cardenal Herrera Oria s/n
39011 Santander
Cantabria (SPAIN)
e-mail: laruc@unican.es
Phone: +34 942 20 22 07



WHO WE ARE



- .- FOUNDED IN 1976 AROUND
NATURAL RADIATION MEASUREMENTS**
- .- 1976-1982: ENVIRONMENTAL STUDIES**
- .- 1982-1985: ALTAMIRA CAVE**
- .-1985-1989: INHALATION TOXICOLOGY RESEARCH
INSTITUTE, USA**
- .-1989-TODAY: RADON STUDIES IN SPAIN
RADIATION PROTECTION IN STEEL FACTORIES**

**Laboratory validated by Health Protection Agency
(HPA, UK) for indoor radon measurements**

**Laboratory Quality System certified by AENOR
(ISO 9001)**



COACH



José - Luis Arteché García

BENCH



Santiago Celaya

Summary

- 1. The new Basic Safety Standards (BSS)**
- 2. LNR (Spanish laboratory of Natural Radiation)**

NEW BASIC SAFETY STANDARDS

For protection against the dangers arising from exposure to ionising radiation applies to the management of existing exposure situations including the exposure of members of the public to indoor radon, the external exposure from building materials and cases of lasting exposure resultin from the after effects of an emergency or a past activity

ANNEX XVI

(Articles 53 and 103)

List of items to be considered in the national action plan to manage long-term risks from radon exposures

1. Strategy for conducting surveys of indoor radon concentrations or soil gas concentrations for the purpose of estimating the distribution of indoor radon concentrations, for the management of measurement data and for the establishment of other relevant parameters (such as soil and rock types, permeability and radium-226 content of rock or soil).

2. Approach, data and criteria used for the delineation of areas or for the definition of other parameters that can be used as specific indicators of situations with potentially high exposure to radon

3. Identification of types of workplaces and buildings with public access, such as underground workplaces, and those in certain areas, where measurements are required, on the basis of a risk assessment, considering for instance occupancy hours.

4. The basis for the establishment of reference levels for dwellings and workplaces. If applicable, the basis for the establishment of different reference levels for different uses of buildings (dwellings, buildings with public access, workplaces) as well as for existing and for new buildings.

5. Assignment of responsibilities (governmental and non-governmental), coordination mechanisms and available resources for implementation of the action plan.

- 6. - Strategy for reducing radon exposure in dwellings and for giving priority to addressing the situations identified as radon prone areas.**
 - Strategies for facilitating post construction remedial action.**

7. Strategy, including methods and tools, for preventing radon ingress in new buildings, including identification of building materials with significant radon exhalation.

8. Schedules for reviews of the action plan

9. Strategy for communication to increase public awareness and inform local decision makers, employers and employees of the risks of radon, including in relation to smoking.

10. Guidance on methods and tools for measurements and remedial measures. Criteria for the accreditation of measurement and remediation services shall also be considered.

11. Where appropriate, provision of financial support for radon surveys and for remedial measures, in particular for private dwellings with very high radon concentrations.

12. Long-term goals in terms of reducing lung cancer risk attributable to radon exposure (for smokers and non-smokers).

13. Where appropriate, consideration of other related issues and corresponding programmes such as programmes on energy saving and indoor air quality.

¿¿¿¿¿HARMONIZATION
NECESSARY ?????

PROPOSAL FOR EU RESEARCH PROJECT

“Harmonization criteria to apply the new Basic Safety Standards (BSS)”

LaRUC, University of Cantabria (SPAIN)

EARST WORKSHOP International and national radon regulations and strategies (Bouillon, Belgium), 29 May 2013

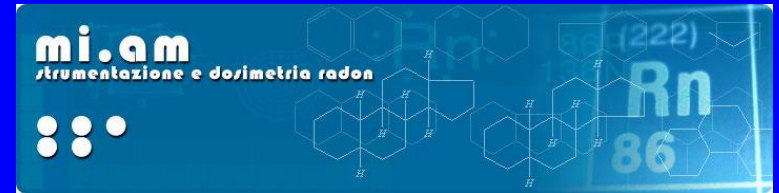
STRUCTURE OF THE PROJECT

- **Minimum 4 work packages**
- **Nº1: Measurements strategy -----1,2 and 3**
- **Nº2: Regulatory approach----- 4,5,8,10 and 13**
- **Nº3: Remedial and Prevention----- 6,7 and 11**
- **Nº4: Risk communication----- 9 and 12**
- **32 POTENTIAL associated partners (27 EU countries + 5 neighbours)**
- **Coordinated by University of Cantabria, Spain**
- **EARST acting as collaborative partner and consultant body**
- **Minimum 3 years project**
- **Authorities, Universities and Research Centres, Companies, etc**



THE SPANISH REFERENCE LABORATORY ON NATURAL RADIATION UNDER FIELD CONDITIONS (LRRN)

Sponsors



INTERCOMPARISON EXERCISE ON EXTERNAL GAMMA DOSE RATE UNDER FIELD CONDITIONS AT THE LABORATORY OF NATURAL RADIATION (SAELICES EL CHICO, SPAIN)

J. L. Gutierrez-Villanueva^{1,*}, C. Sainz-Fernández¹, I. Fuente-Merino¹, J. C. Sáez-Vergara², E. Correa-Garcés² and L. S. Quindos-Poncela¹

¹RADON Group, Faculty of Medicine, University of Cantabria, Avda Cardenal Herrera Oria s/n, Santander 39011, Spain

²Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas, CIEMAT, Environmental Radiological Restoration Programme, Av. Complutense 22, Madrid 28040, Spain

*Corresponding author: gutierrezjl@unican.es

Received May 14 2012, revised November 10 2012, accepted January 23 2013

The last nuclear accident in Fukushima nuclear power plant has increased the necessity for measuring radiation in the environment. Therefore, radiation monitors providing results traceable throughout the country become essential and it is very important to test them under the same environmental conditions. The first intercomparison of natural radioactivity under field conditions was held in Saelices el Chico (Salamanca, Spain) in May 2011, including an exercise on environmental dose rate. This article presents the results achieved by 19 instruments belonging to 12 institutions from 7 different countries. The tested detectors are proportional counters, ionisation chambers, Geiger-Müller and scintillators measuring dose rate in three stations with reference values from 110 to 1800 nGy h⁻¹. All the results were given in terms of air kerma (nGy h⁻¹) and the measurements show agreement within 25 % in all the sites. Evaluation criteria based on accuracy and statistical uncertainty were also carried out and 25 % of participants passed the test in all sites.

INTRODUCTION

The demand for measuring radiation in the environment has been increased since the last nuclear accident in Fukushima nuclear power plant⁽¹⁾. The need for this type of measurements has been essential during the last decades especially after nuclear events such as Chernobyl accident or the Three Miles Island's event. These accidents had transboundary impacts⁽²⁾, and hence, it is important to have radiation monitors available whose results can be traceable throughout the country. In addition to the radiation in the environment coming from artificial sources, the natural component of environmental radiation is also important. Environmental external radiation contains two main components, terrestrial radiation and secondary cosmic radiation⁽³⁾. Terrestrial radiation consists of photons coming from the radioactive isotopes present in the Earth's crust. These isotopes are mainly ⁴⁰K and those from the radioactive decay series of uranium

Many different instruments are currently being used to measure the environmental dose rate exhibiting various designs, features and calibration techniques. Furthermore, there is no general agreement in the radiation quantity that should be addressed. As a result, the comparison of data from different instruments is far from simplicity and a consideration of all these aspects must be made to perform a valid comparison. To this aim, it becomes very important to test these devices under the same environmental conditions. This objective is usually achieved by means of intercomparison exercises either under laboratory or under field conditions. Such exercises provide unique opportunities for participants to check the adequacy of their home calibrations and field measurements⁽⁴⁾. The recommendations of the EURADOS working group 12⁽⁵⁾ propose that the organisations responsible for environmental measurements should participate in national or international intercomparisons.

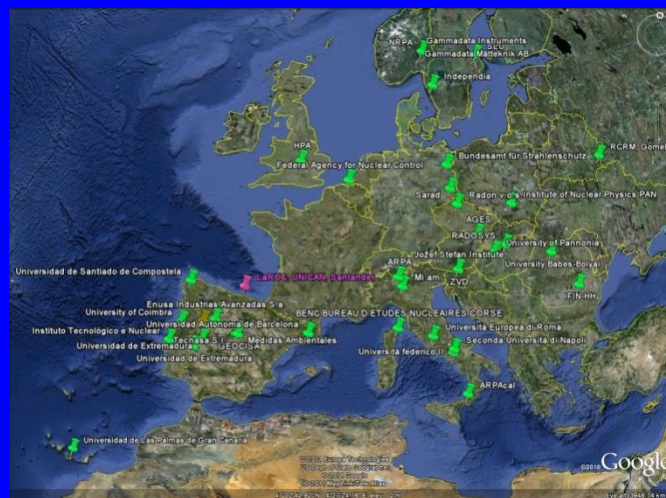


International Intercomparison exercise under field conditions

45 LABORATORIES

16 COUNTRIES

23rd – 27th May 2011



LRRN Main building



Radon in water



Standard solution

Radon diffusion – stable Rn in water
concentration
 $320 \pm 20 \text{ Bq/l}$

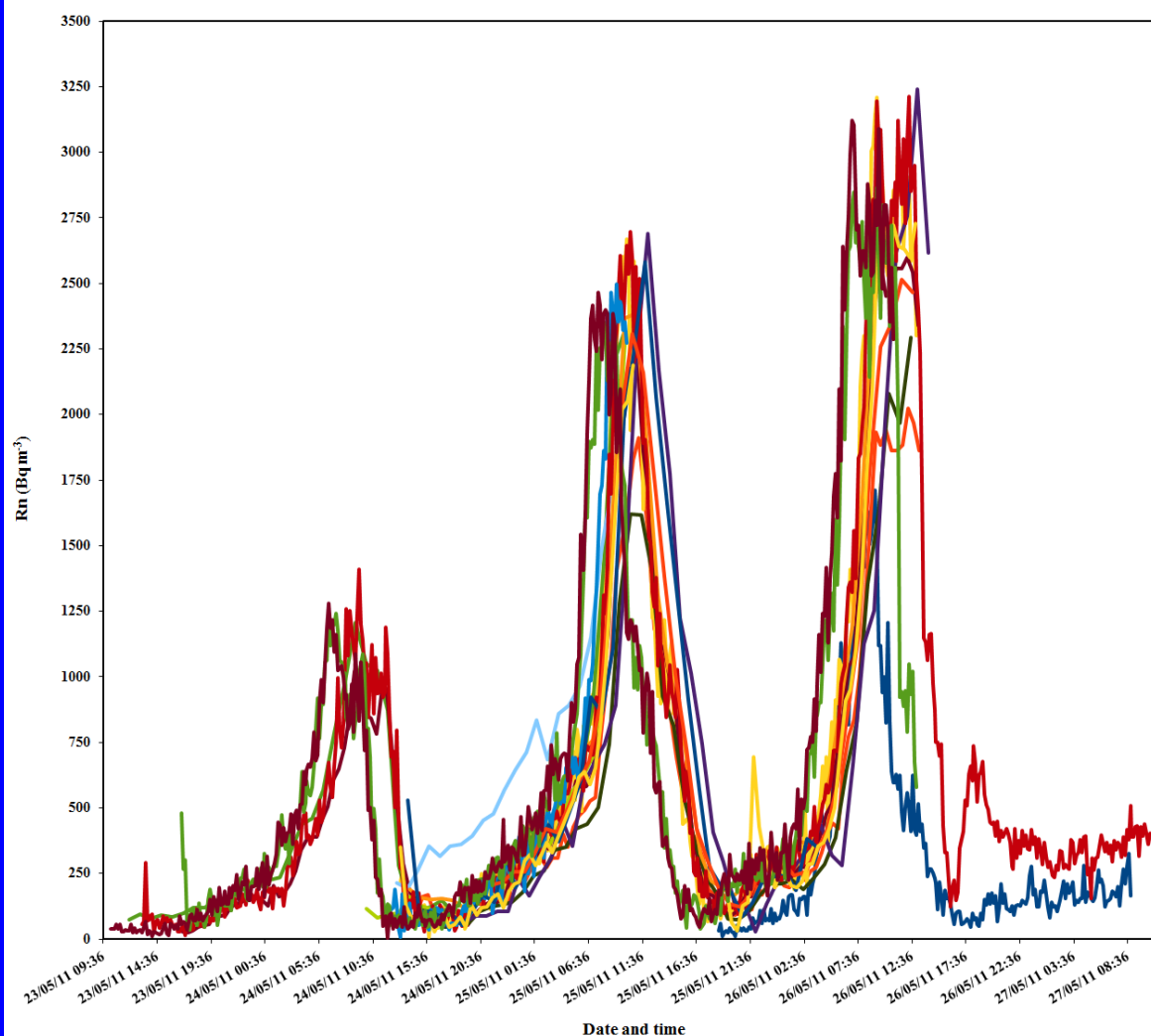
External dose rate

Easy to measure?



3 points – LOW/MEDIUM/HIGH dose rate
Reference CIEMAT (Spain) Reuter Stokes

Indoor radon/Active devices



IFC11_03 IFC11_04 IFC11_07 IFC11_10 IFC11_13 IFC11_16 IFC11_17 IFC11_18 IFC11_21
IFC11_24 IFC11_26 IFC11_27 IFC11_28 IFC11_29 IFC11_30 IFC11_36 IFC11_37

Time syncro

Homogeneity

Response

Necesity of
calibration



**Inhomogeneous
field**

**Discrepancies point to
point**

**Comparison of
“radon index”
estimation**

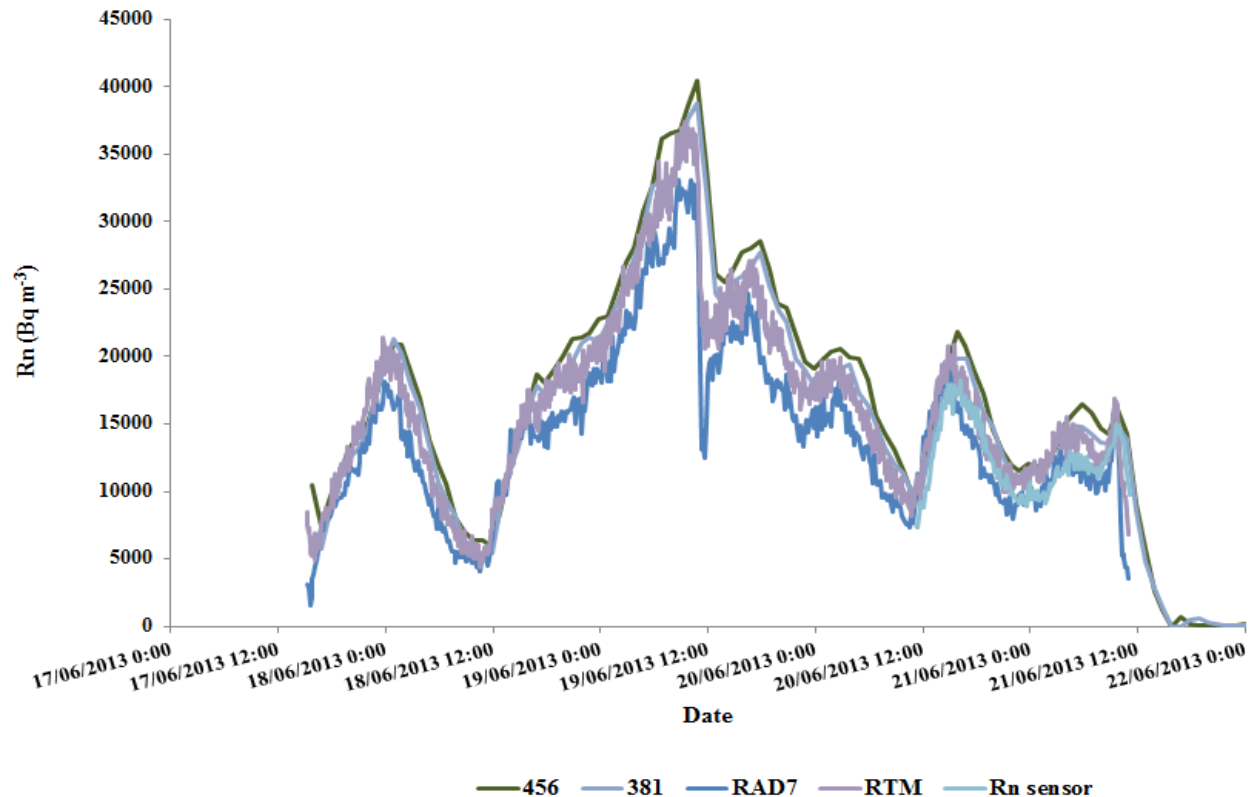


“Friendly” International Intercomparison exercise under field conditions

SPONSORED BY LANDAUER, SARAD, RADOSYS, MIAM, ENUSA & UNIVERSITY OF CANTABRIA

18 LABORATORIES - 7 COUNTRIES – Rn 3 exposures

17th – 20th June 2013



THE LRRN PROVIDES A BETTER KNOWLEDGE OF THE RESPONSE OF DETECTOR UNDER FIELD CONDITIONS, WHERE MORE VARIABLES AFFECT THE MEASUREMENT OF NATURAL RADIATION

THE LRRN LET US COMPLEMENTARY TEST OF DEVICES AND SYSTEMS

NEW COMPARISONS (DOSIMETERS, ETC...) ARE PLANNED FOR THE FUTURE

IMPROVEMENTS ARE NOW ONGOING TO DEVELOP MORE EXPERIMENTS ON RADON ACTIVITIES

THE LRRN AIMS TO BE A MEETING PLACE FOR RESEARCHERS ON NATURAL RADIATION



- Portada
- ¿Qué es el Radón?
- Normativa
- Biblioteca
- Enlaces
- Contacto

Categorías

Noticias elradon.com

Otras Noticias

Proyectos de Investigación

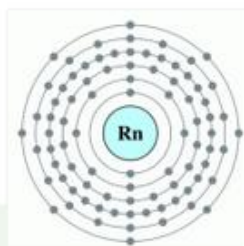
Artículos elradon.com

elradon.com

Cátedra de Física Médica.
Departamento de Ciencias Médicas y Quirúrgicas.
Universidad de Cantabria.



Noticias de elradon.com



El Grupo Radon de la Cátedra de Física Médica de la Universidad de Cantabria impartirá el curso: "Prevención y detección de material radiactivo en aceras"

VII Jornadas sobre calidad en el control de la



First East European Radon Symposium (FERAS 2012) September 2th - 5th, 2012 Cluj-Napoca, Romania

Third International Geo-Hazards Research

THANKS FOR YOUR
ATTENTION