

**International Radiation Protection Association
12th International Congress
Buenos Aires, Argentina – October 19-24, 2008**



IRPA 12

Concluding Plenary Session III

**NORM in Industry
P A Burns**



NORM in Industry

TS III 4 NORM in Industry was divided into four topic areas

- TS III 4.1 NORM Uranium Mining and Processing
- TS III 4.2 NORM Other Minerals Mining and Processing
- TS III 4.3 NORM in Oil and Gas Industries
- TS III 4.4 NORM and Radon Issues in Building

TOPICAL SESSION III.4.1: NORM - URANIUM MINING AND PROCESSING

- 7 oral presentations
 - 3 posters presentation
 - 9 countries
-
- COMMON ISSUES DEALT IN ALL PAPERS:
 - regulatory policy;
 - environmental impact of uranium mining and milling and
 - radiological impact on workers and on the public.

TOPICAL SESSION III.4.1: NORM - URANIUM MINING AND PROCESSING

•IMPORTANT CONCLUSIONS:

- Uranium industry is undergoing a renaissance.
- Radiation protection procedures and regulations needed.
- Shortage of trained and experienced radiation protection professionals - cannot be produced overnight.
- Public education required.
- Interaction between regulators and operators must be stressed.

TOPICAL SESSION III.4.1: NORM - URANIUM MINING AND PROCESSING

•IMPORTANT CONCLUSIONS:

- All parties need to work to achieve high levels of excellence in the management of radiation health, safety, waste and the environment
- Strong safety culture should be based on internationally shared principles.
- Needed for emerging uranium producing countries.
- “Best practices standards” need to be introduced.
- Social acceptance will depend on proper management
- International organizations (i.e, IAEA, WNA, ICRP, IRPA) have a role.



Technical Session III 4.2

NORM Other Minerals Mining and Processing

- Thorium in rare earths
- Phosphates
- Coal
- Country reviews
- Models for evaluation
- Elevated background
- Scale on water pipes

Technical Session III 4.2 NORM Other Minerals Mining and Processing

- A wide variety of industries produce NORM
- Several countries have undertaken comprehensive reviews
- Usually large volumes of low activity material
- Measurement of NORM and dose estimation

Technical Session III 4.2

NORM Other Minerals Mining and Processing

- System of radiation protection includes NORM
- Regulatory instruments and management tools need to be flexible to handle wide variety of situations
- Legacy sites and decommissioning were discussed

Topical session III.4.3

Norm in Oil and Gas Industries

- Countrywide surveys
- Pipes scales and sludges
- Measurement techniques
- Decommissioning
- Radon

Topical Session III.4.3 Norm in Oil and Gas Industries

- ✓ **Surveys in oil fields:**
- ✓ Large amount of scales and sludges
- ✓ Dose rates - background to $150\mu\text{Sv/h}$
- ✓ $400\mu\text{Sv/h}$ in a pump
- ✓ 400kBq/m^3 radon gas in propane stream
- ✓ Maintenance of pipes and equipment
- ✓ Disposal of Norm wastes
- ✓ Decommissioning of installations

Topical session III.4.3 Norm in Oil and Gas Industries

- ✓ NORM in Brazilian facilities
- ✓ Equatorial oil fields – safety manual
- ✓ Management strategy in Arabia Saudi
- ✓ Belgian regulatory framework

- ✓ Measurements
- ✓ Liquid scintillation: ^{222}Rn , 228 , ^{226}Ra , ^{210}Pb
and ^{210}Po
- ✓ Radium isotopes
 - ✓ assess Th/U in geological formations
 - ✓ dating scales and contaminated soils



Technical Session III 4.4

NORM and Radon Issues in Building

Large number of papers on a wide variety of issues

- Measurements and modelling
- Regulation
- Surveys and dose measurements
- Management of risks and waste

Technical Session III 4.4

NORM and Radon Issues in Building

- Large number of surveys on different issues
- Radon build up in workplaces
- Radioactivity in building materials
- Radioactivity on tobacco

Technical Session III 4.4

NORM and Radon Issues in Building

- Measurement and modelling in a variety of situation
- Regulation and management of materials

TS III 4 NORM in Industry – Conclusions

What's out there?

- Wide variety of NORM industries
 - Uranium, Rear Earths
 - Coal, Oil, Gas
 - Phosphates, Mineral Processing and others
- NORM can concentrate in:
Products, By-products and Residues
- Exposures to Large Populations – Small Doses
- Exposures to Small Populations – Larger Doses
 - Occupational exposures

TS III 4 NORM in Industry – Conclusions

How to measure it?

Difficult measurement situations

- Measurement of Activity or Activity Concentration
 - Long decay chains – Disequilibrium
 - Hard to measure – radium, radon, thoron, Pb 210, Po210
- Modelling exposure pathways
 - Lot of assumptions
 - Averages adopted for widely varying situations
- Assessing doses to individuals
 - Large uncertainties – internal exposure

TS III 4 NORM in Industry – Conclusions

What to do about it?

- No one solution to the management of NORM
- Wide variety of regulatory instruments required
- Graded approach
 - Exclusion, Exemption, Clearance, Notification
 - Registration, Licensing
- Managed as Planned or Existing Exposure Situations
 - Dose Constraints or Reference Levels
- Numbers of people exposed and magnitude of exposures should be Optimised within dose bands
- Flexibility required