Decommissioning in the UK ‘NORM Industries’

Dr Nick Chambers
Radiation Protection Adviser & Senior Waste Management Consultant
Studsvik

Waste Management and Engineering Services

• Four UK sites
• Inc. Metals Recycling Facility

Waste Management Consultancy

• Radioactive waste policy and strategy
• Planning, design and licensing support
• Radioactive waste management
• Assurance services
Studsvik

- Predominantly UK Nuclear
- Increasing involvement in *NORM industrial practices*
  - UK & Middle East
    - Oil & Gas
    - Mineral extraction/processing
- Increasing awareness of potential NORM issues
EBOC13

• Naturally-occurring Radioactive Materials (NORM)
  – Description
  – Radiological hazards

• Case Study
  – Oil & Gas Decommissioning (Petrofac FPF1 destruct)
What is NORM?

- Naturally-occurring radioactive material
- Specifically, radionuclides of the uranium and thorium decay series.
- Present in all rocks, soils etc.
- Radiological hazard
  - External radiation exposure (gamma and X rays)
  - Internal radiation exposure (alpha and beta particles)
- Responsible for the majority of our exposure to ionising radiation
Natural Decay Series

[Diagram showing the natural decay series with isotopes and decay times, including Uranium, Thorium, and Actinium series.]
Oil & Gas – NORM Contamination

• Potential for NORM contamination at all stages
  – Exploration
  – Production
  – Processing/refining

• Waste streams
  – Produced water
  – Insoluble scale
  – Sludge
  – Dusts

• Awareness issue
Oil & Gas – Decommissioning

- Residual scale and sludge within pipework, tanks etc.
- Identification difficulties due to shielding
- Once accessed – contamination hazard
- Various techniques for decontamination
- Scales – high-pressure water-jetting
  - Performed in an enclosure
  - Closed water system
  - Collection of NORM in filter beds
Oil & Gas – Decommissioning

• 2012 Destruct of former North Sea Floating Oil/Gas Production Facility
• EPR10 Permitted facility on Teesside
• Radiological surveys to identify NORM
• Cutting under controlled conditions
• Monitoring of internal surfaces
• Lab analyses of contaminated materials
Oil & Gas – Decommissioning

• Decontamination (HP Water-jetting facility) based on in-situ monitoring results
• Representative sampling and analysis of waste; informed disposal options.
• Consideration of hazardous properties (e.g. Hg and As)
• 5 tonnes LLW waste consigned to specified landfill
• Recovery and recycling of ~300 tonnes of metal
Summary

• Increasing awareness
  – EPR10 includes ‘NORM industrial activities’
  – Industry Profiles associated with contaminated land regulatory regime

• Potentially significant internal contamination hazards

• Mitigated via use of standard control measures during decommissioning/remediation

• Issue of disposal options for a significant & growing waste stream
  – Complicated by the potential issue of co-contaminants

• UK NORM Strategy