UK National Nuclear Laboratory – Environmental Remediation

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Presentation Scope

- Challenges and Gaps in Environmental Remediation
- UK Perspective
- Brief Overview of NNL Ltd
  - Who we are
  - Capability in support of Environmental Remediation
  - Role in ENVIRONET
- ENVIRONET and its benefits
Challenges in Environmental Remediation

- Primarily legacy issues.
- Pollution and contamination does not just effect the vicinity of the plant, mine, waste tailings etc.
- Nowadays there is a greater focus on environmental legislation and permits, doing it correctly.
- Disposal Routes.
- Sustainable Technologies.
- Greater requirement for stakeholder engagement.
- **COST.**
Gaps - General

- Need to understand the problem first and often better, but why?
  - To understand the risk
  - To aid the decision making process
  - To understand the funding implications
  - To work within the regulatory framework
  - To know which solutions may work
  - To choose the most appropriate options and solutions
    - Sustainability
UK Nuclear Industry Challenges

• We use the term remediation but is the term management more appropriate?

• Very few examples of provable solutions apart from moving material from one location to another.

• Not enough sharing of experiences and output from R&D.

• Do the commercial challenges and restrictions our organisations face prevent us from communicating and helping those who need it most?
UK Nuclear Industry Challenges

• Contamination within the ground or groundwater on nuclear licensed sites may be radiological, non-radiological or a combination of the two.

• Causes
  • Historical leaks from buildings/silos.
  • Accidents/Incidents.
  • Continued leaks from buildings/silos.
  • Cross contamination from one aquifer or water body to another through poorly installed boreholes.
  • Failing disposal facilities.
  • Non engineered burials.
  • Aerial discharges.
UK Perspective – Nuclear Industry

• Only two nuclear installations with significant soil and groundwater issues.
  • UK’s National LLWR needs to prove there is no environmental risk from migration.
  • Ageing single skinned plants still exist.
• Funding drivers are leading to a prioritisation of the decommissioning work.
• However, remediation might be required to support decommissioning, site end state declaration, de-licensing, stewardship and liability estimates.
• Networks like SAFEGROUNDS and CL:AIRE provide guidance and technology demonstrators respectively.
UK Perspective – Nuclear Industry

- Hazards
  - Contaminated soil and groundwater.

- Drivers to act
  - Risk to the environment through the migration of contaminants.
  - Exposure risks to site workers.
  - Financial and legal liabilities.
  - Delicensing and potential land re-use.
  - Good management.
  - Increase stakeholder trust.
  - Meeting regulatory and site licence issues.
    - Site Licence Conditions 32 & 34
National Nuclear Laboratory (NNL Ltd)

- Former Research Capability component of BNFL.
- Became Nexia Solutions and is now the UK’s National Nuclear Laboratory (NNL).
- About 800 personnel – looking to increase this by 40% over the next 3 years.
- Environment team has c30 personnel.
- Government owned, contractor operated.
- Consortium of Serco, Battelle and Manchester University run NNL.
- Purely customer funded, i.e. no government funding.
Roles and Aspirations

- International nuclear R&D centre of excellence
- Support new build and clean up
- Safeguard nuclear expertise, facilities and skills
- Deliver value for customers
- Trusted advisor
- Collaborations/Partnerships/Links
- Socio-economic focus
National Nuclear Laboratory

Unique Combination

Facilities

People
National Nuclear Laboratory

Products and Services:

- Fuel Manufacture and Reactors
- Operating Reprocessing/Waste Plants
- Decommissioning and Treatment of Legacy Waste
- **Environmental Management**
- Modelling and Simulation
- Disposal
- Defence
- CBRN/Homeland Security
- New Nuclear Build/Future Nuclear Systems
- Research Training and Academia
Capability in support of Environmental Remediation

- Undertake a wide range of environmental work.
- Site characterisation, data assessment and GIS, record keeping.
- Stakeholder Engagement.
- Remediation modelling.
- Remediation studies, optioneering, optimisation and lab and pilot plant trials, R&D, costing studies.
- Decision making.
Remediation Modelling

Simulating permeable reactive barriers
Capability in support of Environmental Remediation

- Experience of working in networks
  - UK based
    - SAFEGROUNDS
    - SAFESPUR
    - SAGTA
    - CL:AIRE
  - International
    - NICOLE
    - ENDSEP
    - IAEA ENVIRONET
    - IAEA IDN (Considering)
Capability in support of Environmental Remediation

- International Experience
  - Worked for the IAEA extensively in the areas of waste management and environmental remediation.
    - Writing Safety Series and TecDocs
    - IAEA Technical Missions
      - Ukraine, Estonia, Romania
    - IAEA Training Courses
    - IAEA projects on safety case development
    - ENVIRONET
  - Undertaken work in Kazakhstan, Kyrgyz Republic, Russia on groundwater remediation projects.
Benefits of involvement with ENVIRONET

• **Two way process**
  • For the IAEA Member States we offer;
    • Experience of the benefits of networking.
    • Extensive experience of working internationally and therefore understand different problems and solutions.
    • Work closely within a regulatory framework.
    • Extensive stakeholder engagement experience.
    • Developed best practice with a wide range of stakeholders.
    • Decision making processes and optioneering studies.
    • Offer pragmatic and sustainable solutions.
    • An understanding of the complete life cycle of operations.
Benefits of involvement with ENVIRONET

• Role
  • Assisted the IAEA in developing the ENVIRONET aspirations and forward programme.
  • Chaired meetings/workshops.

• Benefits of involvement
  • Allows us to help others.
  • Can have our viewpoints and approaches challenged and peer reviewed.
  • We can gain knowledge and learning and apply this both internationally and in a UK context.
  • Maintains our profile in this field.
Priorities for ENVIRONET

• Understanding the complete life cycle of site/plant operation.
• Improved planning.
• Application of the Waste Management Hierarchy.
• Provision of training.
• Sustainability.
• Awareness of approaches and solutions.
• Working closer with stakeholders.

• **Prevention is better than the cure!**
What can ENVIRONET offer its members

• General networking and sharing of experiences.
• Assistance in understanding the reasons behind success and failure.
• Understanding how to apply sustainable solutions.
• Stakeholder engagement.
• Training.
• Hopefully provide a focus which will assist Member States gain funding support.
• Learning how to minimise the problem at the outset.