Sellafield Ltd

Characterisation to Justify the Appropriate Management of Solid Wastes in the Nuclear Industry

Case Study: Characterisation in support of the refurbishment of the Sellafield Sea Line Pipe Bridge

Date: 25th May 2010

S. Murdock
S. Brown

Facility Characterisation

Background

- Project established following a warning of intent by the Environment Agency to issue an Enforcement Notice for the 'failure to adequately maintain an operational effluent pipe line'.
- Controlled area - potential for radioactive contamination.
- The main aspects of the refurbishment included:
  - replacement of concrete piers
  - replacement of the truss
  - replacement of the concrete shield
  - reduction in the width of the deck
  - installation of new steel handrails

Background

- Spanned approximately 120 metres over a tidal river and the Cumbria West Coast Railway Line.
- Baseline estimate of 600m^3 of solid waste to be disposed to the Low Level Waste Repository
- Approximate solid waste disposal cost of £1.3million

Original Pipe Bridge Circa 1950's

Pipe Bridge Prior to Refurbishment

Concrete Shield

Objectives of Characterisation

- To determine the nature and extent of the radiological and chemical contamination associated with the sea line pipe bridge and the adjacent area in order to:

  - apply the principles of the Waste Management Hierarchy to optimise waste routing.
  - underpin appropriate working methods.

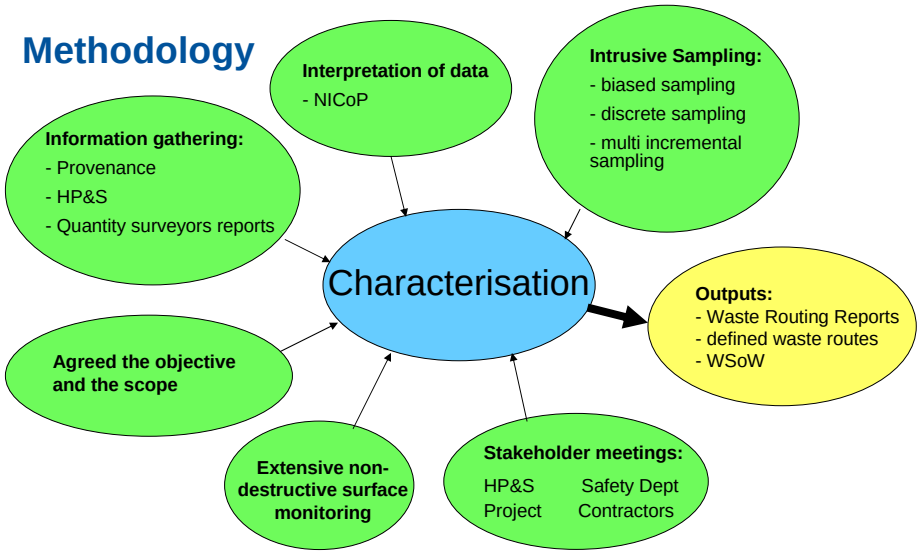
Predicted Benefits

- Reduction in waste disposal costs by:
  - Establishing and maximising the RSA 93 SoLA Exempt waste route
  - Minimising the LLW waste route
- Reduce the burden on the Low Level Waste Repository
- Apply appropriate working methods

Challenges

- Waste Management Hierarchy concept was in the early stages of practical implementation on the Sellafield site.
- NICoP guidance recently issued.
- Step change in the culture of:
  - Waste management
  - HP&S
  - Project

Methodology



Methodology

- **Agreed the objectives and scope**
- **Information gathering**
  - building/area history conducted. Provided historic information regarding events, spillages etc
  - historic HP&S surveys
  - quantity surveyors report
- **Non destructive surface monitoring**
  - using hand held instruments.
  - provided detailed information regarding the surface contamination of the area.

Methodology

- **Sampling**
  - Biased – used for deriving a radiological fingerprint.
  - Discrete – used on the concrete shield and the piers
  - Multi-incremental – used on the deck edge and the truss



- **Data Interpretation**
  - Utilised the NICoP guidance
  - One of the first Facility Characterisation projects on site – helped define the Facility Characterisation Process and the Site Standard.

Results

- Areas of elevated activity were identified e.g. piers and deck edge.
- >90% of the solid wastes contained an average bulk activity below the RSA SoLA exemption threshold of 0.4Bq/g.
- A radionuclide fingerprint was produced for the area – surface clearance levels established.
- The hazardous chemical properties associated with the waste were realised i.e. the lead content in paint and the bitumen in the truss coating.
- Various waste routes were established e.g. VLLW, RSA Exempt, Liquid effluent etc

Impact

- Characterisation allowed the waste routes to be established before work commenced.
- Characterisation enabled waste routing to be optimised:
  - >50m^3 of metal was sentenced as RSA Exempt and cleared into the recycling market.
  - >500m^3 of concrete was sentenced as RSA Exempt and re-used on-site as infill material.
- Reduced the burden on the Low Level Waste Repository.
- Realised significant cost savings with respect to waste disposal, circa. £1million.

Impact

- Provided confidence with regards to the radiological condition of the area to classify tools/equipment as RSA Exempt.
- Working methods were simpler, quicker and cheaper e.g. no requirement to use ventilated tents during cutting operations etc.
- Wider implications for the Site – this was a Proof of Concept for the practical implementation of the Waste Management Hierarchy.

Refurbished Pipe Bridge