National Grid Property – Who we are, what we do and how we do it

Gloucester, 26th May, 2011

Agenda:

- Introduction to National Grid Property
- Introduction to Gasworks and our experience of them
- Cluster and National Grid

National Grid Property – Who we are and what we do

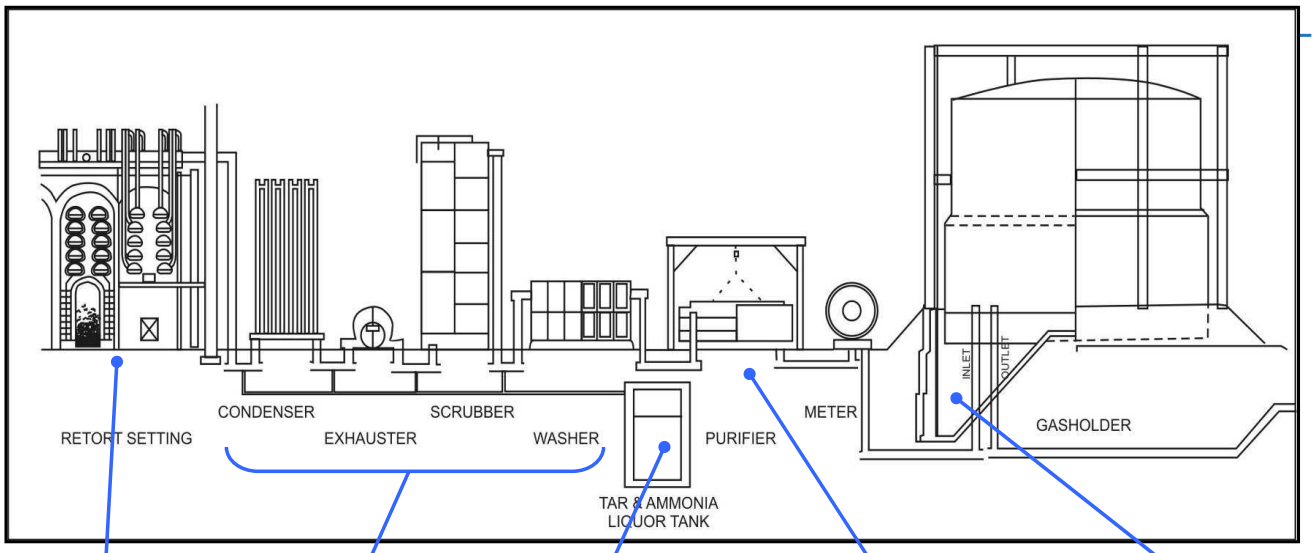
- National Grid Property manage a large portfolio of sites which include gasworks and associated parcels of land.
- We prioritise our portfolio to make the most efficient use of resources.
- We have a portfolio strategy that is proactive and seeks to address sites on a voluntary basis, we are keen to discuss any concerns / interest you may have about National Grid's sites.
- Our objective is to be recognised as a leader in brownfield remediation as we seek to encourage and enable brownfield regeneration.
- We have remediated more gasworks than anyone else.
- We want to encourage the sharing of experience and best practice.

Risk Prioritisation – National Grid Property Approach

- There are currently 1375 parcels of land for which we evaluate and manage risk
- Therefore we have to run a prioritisation process
- This is based on preliminary evaluation of the number and nature and severity of potential pollutant linkages on a site.
- Cross referenced to published map information.
- Re-evaluated regularly throughout the year based on incoming information.

Introduction to Gasworks and our experience of them

Gas Making Process & Remnant Structures



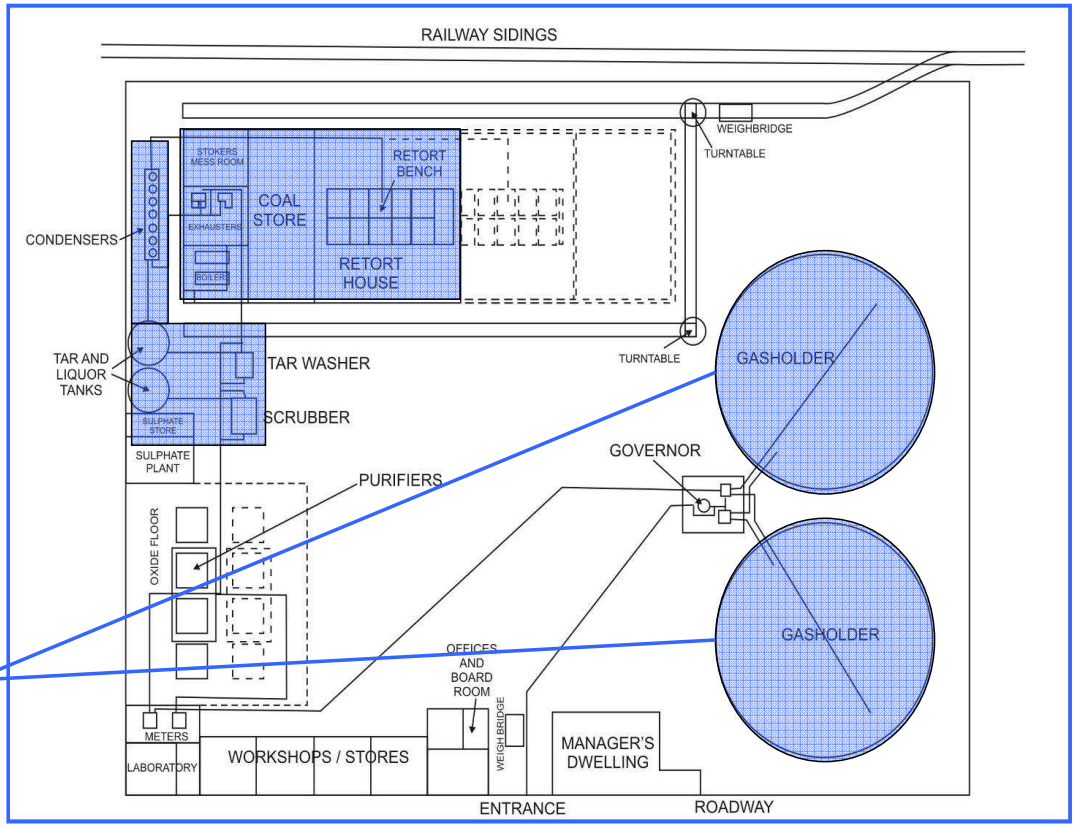
Concrete and brick foundations	Pipework, knockout pots, small tanks, brickwork	Pipework, cast iron/brick tanks	Large concrete or brick recesses, wood slats, blue staining	Slabs, below ground bases
Ash and clinker, asbestos	Tars, liquors, asbestos	Tars, liquors	Spent oxide	Anything! Tars, oxide, wood, asbestos demolition rubble……

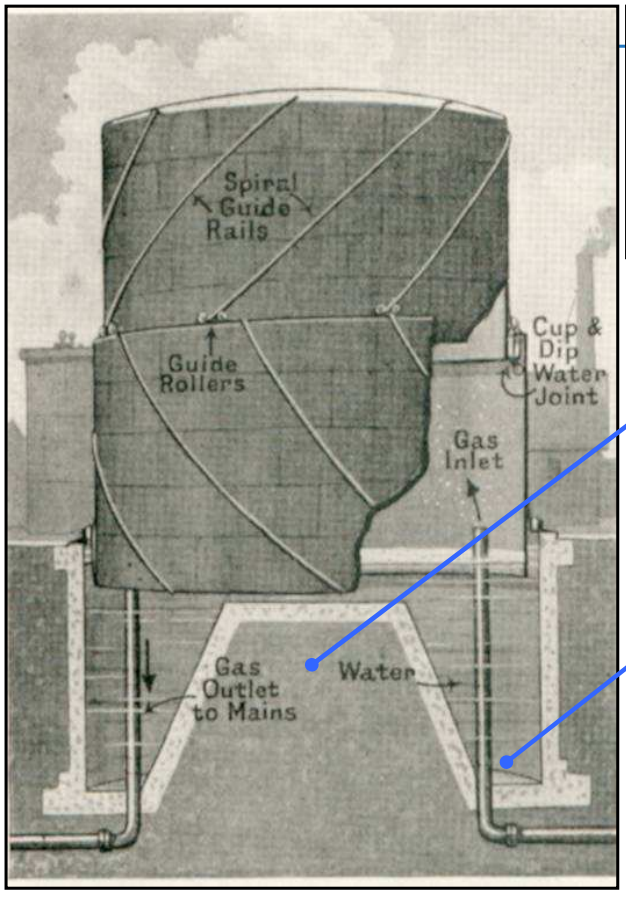
Typical Gasworks Layout

Retort house, large building often near rail lines

Condensers, washers, scrubbers & tanks near retort house

Below or above ground bases. Early holders often converted to tar tanks





'Dumpling'

Tar in annulus

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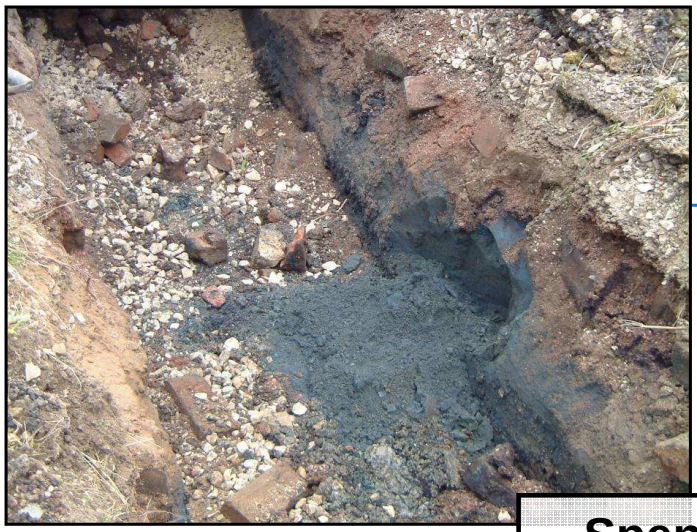
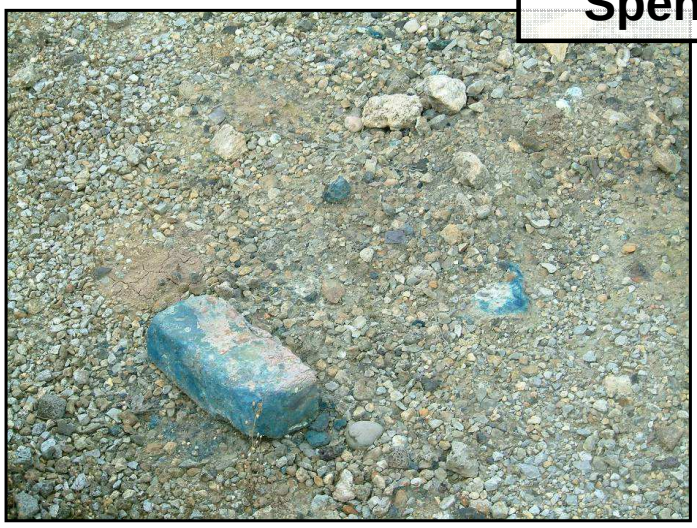
Tar Tanks



Spent Oxide



Constraints - Utility Services

Shallow Depth

Crossing Services

Stub Ends

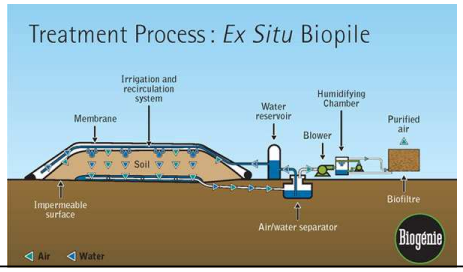
Choice of Remediation Strategy and Technologies – Key Decisions

- Practicability: Technical constraints
- Site constraints
- Time constraints
- Regulatory restraints
- Effectiveness: The extent to which the remediation would be effective
- The timescale
- Durability: The future timescale in relation to the characteristics of the significant pollutant linkage
- What can reasonably and practicably be achieved

Bio-Treatment

Using bacteria/other microbial organisms to break down toxic organic materials into CO2 and water.

- Effective for treating a wide range of materials
- Can treat a range of organic contaminants
- Creates a re-usable product
- Relatively low tech and low cost
- May require long treatment programme
- Not suitable for material for inorganic contaminants



Stabilisation and Solidification

Use of cementitious and pozzalanic additive to chemically 'lock' contaminants into a matrix.

- Effective for treating a wide range of materials
- Can treat a range of organic contaminants
- Creates a re-usable product
- May effect leaching of certain metals
- May create future constraint
- Requires detailed testing and design

Soil Washing

A wet extraction process for separating contaminants from potentially recoverable sand and gravel fractions.

- Effective for treating granular material
- Can treat a range of contaminants
- Creates a re-usable product
- High set-up cost
- Not suitable for material with high fines %
- Requires large amounts of water
- Recovered fines difficult to dispose

Selective Excavation and Screening

Careful excavation and processing to maximise reusable/recyclable materials

- Effective for treating a wide range of materials
- Highly cost effective
- Creates a re-usable product
- Needs careful supervision
- Need to ensure that environmental permitting requirements are met.

Landfill

Off-site Disposal to a Managed Facility.

- Contaminated materials removed from site
- Simplest solution
- Robust long-term solution
- ‘just moving the problem’
- Loss of LFTE post April 2012
- Not all waste can be disposed (e.g. WAC failing material)
- Environmental Impact (Haulage etc.)

Soil Treatment Facilities

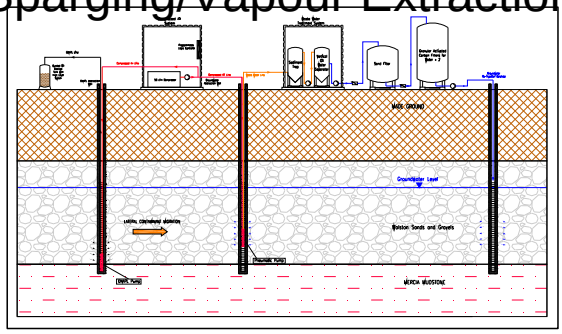
Offsite treatment of contaminated material for reuse

- Effective for treating a wide range of materials
- Material removed from site
- No or reduced LFTE
- Creates a re-usable product
- Lower environmental impact
- Disposal of WAC failing material
- Transport costs to facility
- Material cannot be typically be re-used on site – Increased import cost

In-situ Methods 1

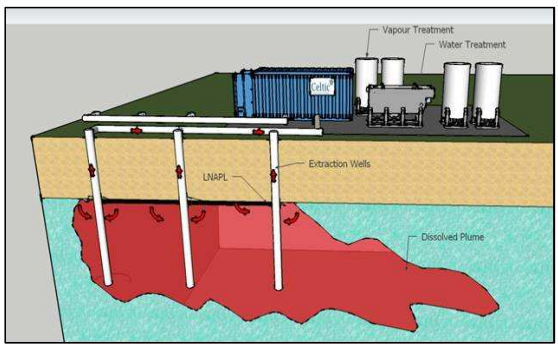
Wide range of methodologies e.g.:

- Multi-phase Extraction
- Chemical Oxidation
- NAPL pumping
- Pump and Treat
- Sparging/Vapour Extraction



In-situ Methods 2

- No mass excavation and can be done while sites remain operational
- Can treat a wide range of contaminants
- Flexibility to treat a wide range of depth and area
- Materials remain on-site
- Potentially less environmental impact
- May require long treatment programme
- Can be technically challenging
- May initially seem complex or expensive



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Cluster and National Grid

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Why Cluster?

- We have a large portfolio and many of the remaining sites are:
  - Small
  - Complex
  - In sensitive settings
  - All of the above
- Cluster allows us to maximise treatment and minimise disruption (as far as possible)

Potential flows of waste and treated materials at a six site cluster

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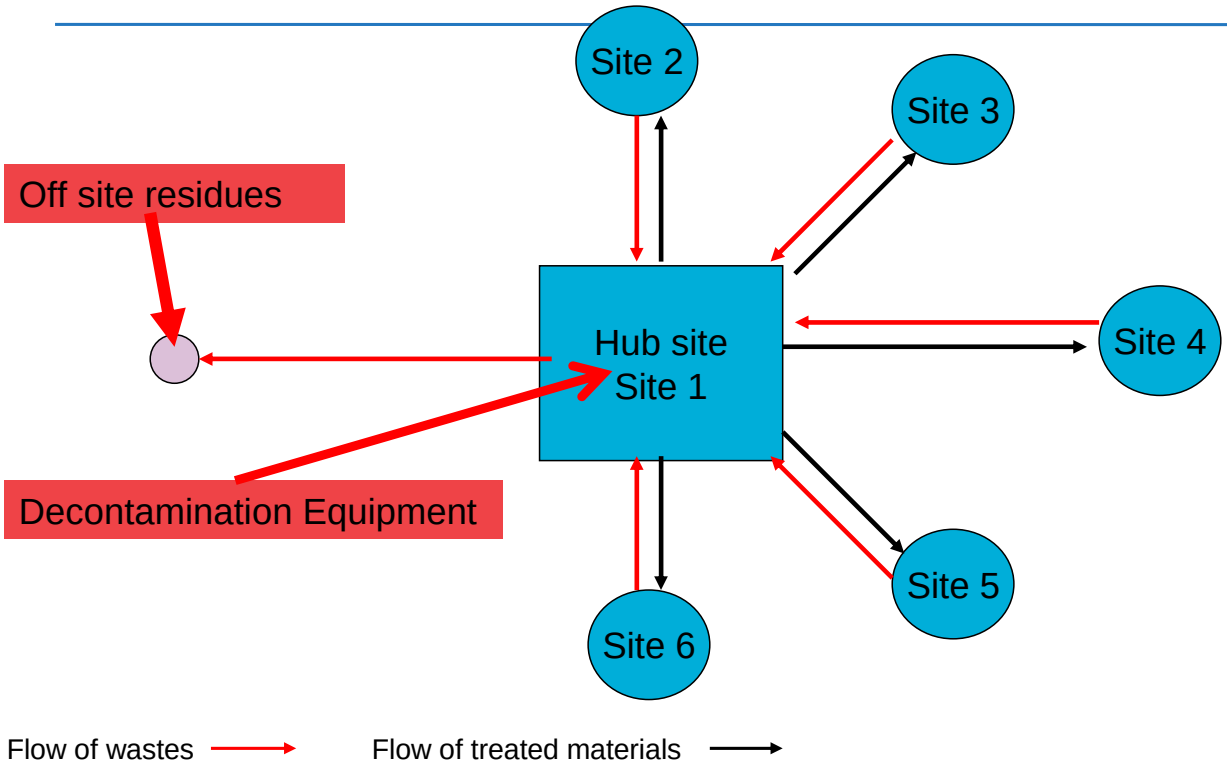

Ref: CL:AIRE – The Definition Of Waste: Development Industry Code Of Practice – Appendix 1 – Cluster Projects

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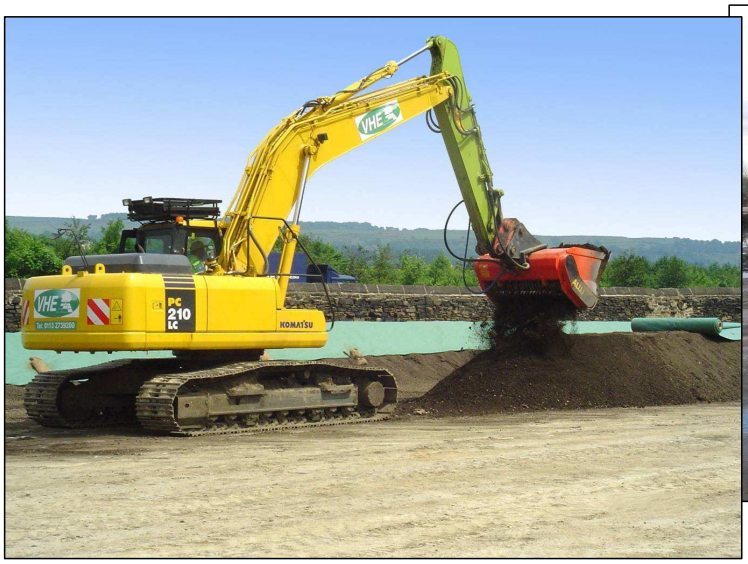
Recent Cluster Project

- North West
- 1 hub site and 4 donor sites
- Combination of treatment on site of origin and transport to hub for treatment



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Recent Cluster Project

- Individual batches from each site are placed into windrows, uniquely identified.
- Initial testing, followed by windrow turning using excavators with specialist attachments.
- Additives may be used to encourage bacterial reduction in hydrocarbons.
- Periodic testing of batches to monitor contaminant reduction.