

Opening remarks

- I believe that the exercise of public consultation, such as the meeting on 5 February 2003, should have been carried out some time ago.
- The approach taken in investigating and remediating the sites represents commonly applied technologies.
- The use of barriers to prevent contact with contaminants is used in many residential and commercial redevelopments

Structure of presentation

- Introduction (CPN & LQM)
- Our brief
- UK Contaminated Land Policy & guidance
- Former Gas works site
- Council Depot
- Landfill
- Conclusions

Land Quality Management

- University research group and private consultancy company specialising in contaminated land
- Based at University of Nottingham
- 8 technical staff – all with MSc and/or PhD
- Clients:
 - Local & central government, regulators, problem holders, developers & other consultants
 - But mainly work for Local Authorities peer reviewing reports through planning and Part IIA

Paul Nathanail

- Specialist in Land Condition
- Chartered Geologist
- Head of Land Quality Management Group
- Director and co-owner of Land Quality Management Ltd
- Research interests:
 - Site characterisation
 - Risk assessment
 - Remediation strategy selection
 - Sustainable brownfield regeneration
 - Public communication & involvement
- Co author of:
 - SNIFFER method
 - Update to SNIFFER
 - Scottish Executive Technical Guidance
 - CIRIA reports on biological and non biological methods of assessment and remediation
 - Contaminated Land Ready Reference Guide
 - Env Agency report on wider environmental value of remediation
- Father
 - Peter, age 6
 - Alexander, age 2

Extract from our commission

The Welsh Assembly, who are providing PFI finance, have requested the County to provide an assurance that "the necessary independent technical expertise will be applied to setting and delivering the appropriate standard for remediation of the site" in response to local concerns.

In order to progress this, the Health Authority Director of Public Health has reached an agreement with the CEO of Conwy County for the Authority to procure an independent review of the proposals.

While the Director of Public Health would commission and receive the report, the intention is that the report would then be made available to all interested parties including the local community.

All fees would be met by Conwy County.

Scope of works

- Review risk assessment report to assess whether:
 - a. the correct pollutant linkages have been identified and the conceptual model of the site is robust;
 - b. the assessment criteria are authoritative, scientifically based and relevant (the tests in Part IIA for guideline values)
- Review Remediation Proposal report - to assess whether the proposed remediation will demonstrably break the identified pollutant linkages
- Prepare letter report on the above
- Present findings to local liaison group/ public meeting.

A pollutant linkage

source Contamination that could cause harm

pathway
How the contaminants can travel to and be taken up by the school children

receptor
In this case the schoolchildren

Conceptual model

a "picture" of the site showing where the sources, pathways and receptors are in relation to one another and what significant gaps in understanding remain to be plugged by further site investigation

Contaminated land management in the UK

- Part IIA, Environmental Protection Act 1990 (inserted by s57 of Environment Act 1995)
http://www.hmso.gov.uk/acts/acts1995/Ukpga_19950025_en_5.htm#div57
- DETR Circular 2/2000
<http://www.defra.gov.uk/environment/liability/circ2-2000/index.htm>
- Planning Policy Guidance Note 23
- Development on Land Affected by Contamination
Consultation Paper on Draft Planning Technical Advice
<http://www.planning.odpm.gov.uk/consult/contamin/index.htm>

UK Policy on land contamination

- Risk based
- Suitable for use
- Source-pathway-receptor pollutant linkage framework
- Aim is to ensure no unacceptable risk given the current or intended land use
- Cf DETR Circular 2/2000

Key technical guidance

<http://www.defra.gov.uk/environment/landliability/pubs.htm#new>

- CLR 7 – gives general overview of technical guidance and legislation
- CLR 9 – basis for selecting health criteria values
- CLR 10 – algorithms and default data for human health risk assessment

published 14 March 2002
published 14 March 2002

ICRCL 59/83 1987

- Long term basis for many contaminated land assessments
- Methodology essentially sound
- Numerical trigger values were realistic but not scientifically derived
- Withdrawn on 20 Dec 2002
- Other ICRCL documents have NOT been withdrawn

Contaminants associated with former gas works

- Heavy metals: Cd, Cr, Cu, Pb, Hg, V, Zn,
- Semi metals/ non metals: As, S⁰
- Cyanide: Complex, free/ liberatable
- Others: SO₄²⁻, S²⁻, asbestos, pH
- Organics: Phenol, aromatics, PAH,

Contaminated land issues at landfill sites

- Landfill gas generation
- Leachate generation
- Complex mixture of waste potentially containing wide variety of contaminants

Remediation

- Should demonstrably break all source-pathway-receptor pollutant linkages
- Options adopted for Ysgol John Bright:
 - remove source (excavated & off site disposal)
 - Interrupt pathway (hard standing, passive & active venting & in ground gas barrier)



The Secondsite (LPG) parcel

- Made ground and gasworks structures over alluvial/ estuarine deposits
- Shallow perched groundwater over non aquifer; general GW flow to the east
- Will:
 - Contain part of school building, predominantly hard surface car park/ footpaths & some landscaping

Komex Environmental Assessment SI Report to LPH

50067-7 July 2001

- Covers desk study & intrusive investigations
- Contains assessment criteria, qualitative risk assessment and proposed remediation
- Overall a detailed competent report that identifies the key issues expected on a site of this type
- General levels of contamination were low with local hotspots (free cyanide & PAH) associated with specific structures and post decommissioning waste disposal
- Water levels in & out tanks differs showing they did not leak / leaked very slowly

50067-7 July 2001

Komex Report Comments

- Poor QA – missing & ‘pp’ signatures
- Site investigation rationale poorly explained
- No conceptual model as such but the information on sources & pathways is there, poor focus on future site users, greater emphasis given to nearby residents.

50067-7 July 2001

Assessment criteria (Table G)

- Poorly justified and now out of date
 - ICRCL 18/79 1986 cited in references
 - ICRCL 59/83 withdrawn Dec 2002 but considered out of date for some time
 - No UK guidelines exist even today for many of these substances
 - No use of risk assessment models to calculate site specific parameters (cf Council Land report)
- *On inspection*: PAH, easily liberatable cyanide & TEX seem high

50067-7 July 2001

Remediation proposals

- Excavation and off site disposal is most common remediation technique in UK
- Use of caps to break pathway is probably second most common
- Extent of remediation areas poorly justified
- No proposed removal of gas holder contents

50067-7 July 2001

The Council owned parcel of land - Council Depot, Cwm Road

- Formerly part of gas works and an asphalt works
- Thin *Made Ground* in a depression over *Alluvium*
- Locally elevated total PAH and TPH associated with Garage & Gas Holder A
- Will:
 - Contain part of school building, soft landscaping & car parking

50067-8 July 2001

Komex Environmental Assessment SI Report to CCBC

50067-8 July 2001

- Site investigation rationale poorly explained
- Location of diesel/ petrol tank found by EAC not shown or apparently considered; no extract from EAC report provided
- Poor logging practice
- Inconsistencies in report
- No conceptual model as such; information on sources & pathways is there
- Recommendation for further SI after demolition of buildings - ??none done

50067-8 July 2001

Assessment criteria

- Drawn from various sources:
 - Soil: Current practice, Canadian MUST, ICRCCL 59/83
 - Groundwater: EQS, DWS, PNEC
- Apparently use of different ICRCCL report than for LPH site
- Use of total PAH does not represent 'best practice' in 2001
- Canadian MUST 1991 not best practice in 2001 (TPH CWG more up to date)
- Unclear why guidelines for residential use presented here but not for LPH site

50067-8 July 2001

Remediation proposals

- Excavation and off site disposal is most common remediation technique in UK
- Use of caps to break pathway is probably second most common
- Extent of remediation areas poorly justified
 - How was extent of Area A & B determined?
 - Extent of area C (around tar pit) not shown on remediation plan
 - How were depths to remediate determined?

50067-8 July 2001

The Council owned parcel of land –Landfill

Babtie Site remediation statement

- Waste transfer station
- Playing field
- Refuse destructor
- Partially infilled clay pits
- Will:
 - *Contain most of school buildings (small part over known landfill); playing fields (Mainly over landfill), soft landscaping*

Babtie Site remediation statement

Analytes

- Includes TPH – were BTEX and Chlorinated solvents tested for?

Babtie Site remediation statement

Landfill gas regime

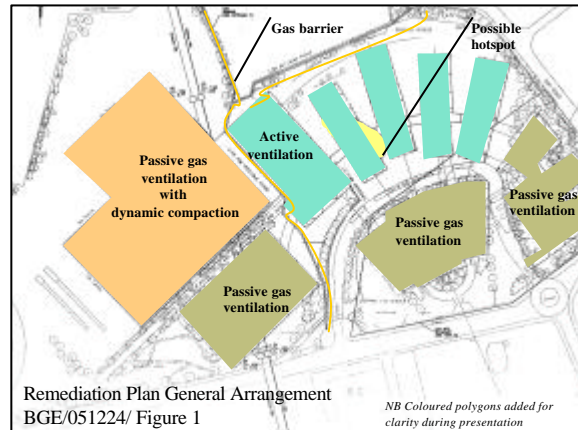
- LFG at high concentrations (69% CH₄; 21.5% CO₂)
- Inconsistent interpretation of consequences of LFG (p9 no change at perimeter due to redevelopment; p19 need for gas migration barrier between 2 schools as gas may migrate to junior school after redevelopment.)

Babtie Site remediation statement

Assessment criteria

- Use of SNIFFER & RBCA represented good practice at time of report, but no longer current
- Dutch guidelines for groundwater
- PAH based on BaP only – underestimates toxicity of other PAH

Babtie Site remediation statement



Remediation proposal

- Excavation and off site disposal is most common remediation technique in UK
- Use of caps to break pathway is probably second most common
- Use of landfill gas barrier is common

Babtie Site remediation statement

Conclusions

- Have the correct pollutant linkages been identified? - YES
- Is the conceptual model of the site robust? - No conceptual model seen.
- Are the assessment criteria authoritative, scientifically based and relevant (the tests in Part IIA for guideline values)? – NO
- Will the proposed remediation demonstrably break the identified pollutant linkages? - Not all of them

Is the conceptual model of the site robust?
– NO

- There are no conceptual models in the sense meant by BS 10175:2001
- The spatial relationship between contaminants and receptors can however be determined from the information available

Are the assessment criteria authoritative, scientifically based and relevant (the tests in Part IIA for guideline values)?

- ☹ ICRL has been withdrawn & are not scientifically based
- ☹ SNIFFER is out of date
- ☹ RBCA without modification is inappropriate and is not authoritative
- ☹ Dutch guideline values are not authoritative

Will the proposed remediation demonstrably break the identified pollutant linkages? – Not all of them

- ☺ Cover system will break pathway
- ☺ Gas protection measures are adequate and industry standard (key is maintenance)
- ☺ Most of school buildings not above landfill
- ☺ Some high methane concentrations beneath school
- ☺ Gas migration barrier to prevent lateral migration of gas to underneath school buildings
- ☺ Assume ignition sources will be present
- ☺ The use of inappropriate assessment criteria could result in unsuitable material being replaced or left in place at/ near the surface

How close to a residential standard is the proposed remediation?

- Car park
 - pathway interrupted; most volatile contaminants removed
- Playing fields
 - pathway interrupted; uncertain if pathway recreated by replacement of material below site assessment criteria
- School:
 - Barriers proposed: incorporated on many residential developments
 - Active venting and alarm systems will interrupt pathway. Not acceptable in new housing (long term cannot be enforced).
- Landscaped areas
 - Potential for unacceptable material to be left in place or deposited there due to out of date assessment criteria



Closing remarks

- The site has been adequately investigated but reports good have been better compiled
- Assessment criteria are out of date
- Remediation scheme is commonly applied in UK
- Remediation standard is not far off that needed for residential use (active gas venting and alarms not appropriate for residential)
- Council should liaise with public better

recommendations

- Assessment criteria should be reviewed in light of CLR 9 & 10
- site visit for local residents
- technical consensus meeting
- remediation verification proposals should be reviewed prior to remediation completion
- remediation completion reports should be reviewed to ensure site is demonstrably safe for use as a school