



Environmental Health

Regulatory Assessment: Stoneyhill Landfill Site

DATE: 26/11/2008

TO: IAN MERCER

FROM: IAIN WHEELER

SUBJECT: STONEYHILL LANDFILL SITE INVESTIGATION SUMMARY

A full and thorough investigation, in accordance with Part IIa of the Environmental Protection Act, has been carried out by the Environmental Health Department at Stoneyhill Landfill site. Due to the technical nature of the reports, this non-technical summary highlights the conclusions and findings of all investigation sources.

The following Documents are pertinent to this investigation and need to be read in conjunction with this summary:

Gap Assessment and Scoping Document, Jacobs Ltd, May 2007

Dangerous Substances and Explosive Substances (DSEAR) Assessment, Jacobs Ltd, May 2007

Trace Gas Analysis, National Laboratory Service, November 2007

Modelling of Emissions to Air from Flare Stack, CERC, March 2008

Stoneyhill Closed Landfill Site: Updated Conceptual Site Model, Jacobs Ltd, February 2008.

Report for Landfill Gas Pumping Trial at Stoneyhill Landfill Site, Biogas Ltd, September 2008.

The investigation is comprised of the following sources:

- 1. Trace Gas Analysis and Subsequent Emissions Modelling**
 - 2. Gap Assessment and Scoping Document**
 - 3. Controlled Waters Risk Assessment and Updated Site Conceptual Model**
 - 4. Landfill Gas and Human Health**
 - 5. DSEAR Assessment**
 - 6. Combined Gas and Leachate Pumping Trial**
-



1: Trace Gas Analysis:

Trace gas analysis was carried out by Mr. Stephen Phipps of the EA National Laboratories Service. Samples were taken from four locations; two at perimeter boreholes and a sample from each gas main. The comments made by the laboratory are as follows:

- *The concentration of vinyl chloride and chlorinated organic compounds in gas lines is low.*
- *The Methane-to-Carbon dioxide ratio, trace components, and absence of helium in borehole gas samples indicate the source is landfill gas.*

Subsequently, this raw data was used to feed into emissions modelling using “ADMS” by Cambridge Environmental Consultants Ltd. This report is specifically concerned with volatile gases and trace gases formed via *de novo* synthesis, including the following:

- Dioxins,
- Benzene,
- Vinyl chloride,
- Toluene, Ethyl benzene,
- Xylene,
- Trichloroethene,
- Tetrachloroethene

The report by Cambridge Environmental Research Consultants concluded:

- *There are no predicted exceedences of the Air Quality Objectives or Environmental Assessment Levels (EALs), as appropriate, for any of the modelled pollutants.*
- *Regarding the VOC pollutants, even assuming the worst case destruction efficiency (25%) the modelled concentrations are much lower than their corresponding EALs. This is mainly due to the fact that the emission concentrations are low even in the pre-flare lines - the pollutants are already relatively dilute on emission from the flare and are rapidly diluted further on mixing with the air.*

Regulators Comments:

No pollutant linkages have been identified from trace gas emissions from the flare. However, it is important to note that elevated flares are no longer permitted for use on active landfill sites. As such, the flare will require to be upgraded to a ground flare, in accordance with Environment Agency best practice.

2: The Gap Assessment and Scoping report, May 2007

The Gap Assessment and Scoping report, produced in May 2007, is essentially a historical review of the site. All records relating to the operation and management of the site were made available to Jacobs for scrutiny in order to devise a scope of work and sampling strategy for undertaking a ground investigation by Jacobs Ltd.

Regulators Comment:

The Scoping Document is a useful document in terms of compiling and scrutinising all previous investigations, reviewing all available site operation records, including accepted waste streams, potential breaches of compliance, and anecdotal, yet unsubstantiated claims of illegal tipping were also taken into account in producing this document.

3: Updated Site Conceptual Model: Jacobs, 2008.

The investigation involved direct sampling of each of the five phases of the landfill site, together with sampling of surrounding deep and shallow groundwaters, and surface waters (nearby ponds).

The site investigation report pertaining to controlled waters risk assessment by Jacobs Ltd has identified the following issues:

The following potential pollutant linkages were identified:

- 'List II' Metals (Nickel) in shallow and deep groundwater
- Aliphatic and Aromatic hydrocarbons in deep groundwater
- Elevated levels of Malathion (organophosphate insecticide) in deep groundwater
- Dibutyl tin in groundwater
- Elevated levels of ammoniacal nitrogen in shallow and deep groundwater

Conclusions of the Jacobs report:

Risks to Controlled Waters (Groundwater):

There is evidence of Organotin compounds in the groundwater at levels similar to that found in the leachate but these are at very low concentrations. There is evidence of groundwater contamination from leachate, especially in Borehole 9, mainly with List I and II substances north of the site. Levels of aromatic and aliphatic Hydrocarbons have been detected in groundwater at concentrations greater than those detected in leachate samples, thus indicating additional external factors influencing the groundwater. The pH results indicate fluctuations to the extremes with both acidic and alkali groundwater being detected, indicating the presence of external



sources other than the landfill acting upon the groundwater. The low pH values indicate the potential for acid mine water to be present in the vicinity and influencing the groundwater chemistry.

Although this linkage may be considered as a pollution linkage it cannot be entirely attributed to the landfill.

Risks to Controlled Waters: (Surface Waters)

Although levels of ammoniacal nitrogen and manganese were elevated in the ponds, these are not high enough to indicate leachate contamination and may be from other sources.

Regulators Comment:

The Only List II metal in exceedence of its respective Environmental Quality Standard (EQS) is Nickel, which has been identified in deep groundwater in two of six monitoring boreholes. This can be attributed to the coal measures, which are naturally high in Cadmium, Nickel and Zinc, and as such may not be from the landfill site.

Only one of the six deep boreholes exhibited elevated levels of Malathion.

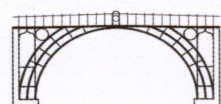
Only one of the six boreholes exhibited elevated levels of dibutyltin.

Given the potential impact upon controlled waters, the Jacobs report (in draft format) was submitted to the Environment Agency for their considerations. By strict definition, identification of list I and II substances in controlled waters would deem the site as a “Special Site” although many of these substances have been found in very low (parts per trillion) concentrations.

In a letter to the Council, dated 31st March, following a site visit, The Environment Agency confirmed that the site does not fall under the definition of a “Special Site” as no significant pollution of controlled waters is occurring, and the EA have no further issues with the site at this time.

It is important to note that the anecdotal claims of illegal tipping of Agent Orange and PCBs from Monsanto in South Wales have not been evidenced by way of scientific method.

As such, given the underlying aquifer’s status as a minor aquifer, together with the absence of any potable extractions due to the long-standing impaction on quality by acid mine drainage from the legacy of historical coal mining, no further actions are deemed necessary in terms of pollution of groundwaters.



4: Landfill Gas and Human Health:

The Jacobs report, dated February 2008, also investigated migration of bulk landfill gases in peripheral boreholes. The report finds: *A pollution linkage has been determined for landfill gas. There is a landfill gas source which is present in boreholes along the entire perimeter of the landfill boundaries in levels that are a risk to human health.*

Regulators Comment:

The Environmental Health Department have recently monitored for landfill gas within nearby properties and found no evidence of gas migration within properties. The Lightmoor village development is not considered to be at risk from gas migration from the landfill site, given the 100m standoff from the site. Planning conditions relating to the Lightmoor development have also been imposed to ensure that site-specific gas risk assessment be undertaken and that properties include appropriate gas mitigation measures.

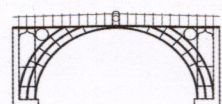
Whilst the report suggests that there may be an influence of gas originating from the underlying coal measures, the EA labs have confirmed that gas in perimeter boreholes is of landfill origin. As such, landfill gas migration is occurring at unacceptable levels and will need to be addressed. However, at this time the regulator is satisfied that local residents are not at risk from ingress of landfill gas from this site. Ongoing monitoring is being carried out to ensure that the community is safeguarded.

5: DSEAR Assessment: May 2007.

A DSEAR (Dangerous Substances and Explosive Atmospheres) assessment was undertaken by Jacobs Ltd on behalf of the E&R Department in accordance with the regulations. Any recommendations found in this report will need to be implemented, and at the time of writing, it is understood that many of the recommendations have already been implemented.

Regulators Comment:

Whilst technically not associated with the Part IIa investigation, this report ensures that the Council, as custodians of the site, are managing the site in accordance with the Dangerous Substances and Explosive atmospheres Regulations 2002, thus complying with Health & Safety responsibilities.



6: Combined Leachate and Gas pumping trial by Biogas Ltd

A combined gas and leachate pumping trial was commissioned to identify provide site-specific information relating to the true gassing potential of the landfill site and leachate generation/recharge. In order to facilitate this, six new boreholes were commissioned. A study of borehole logs and arisings have confirmed the significant thickness of the landfill cap, and have also confirmed the high leachate levels within the site.

Unfortunately the site has not been deemed suitable for biogas electricity generation due to the site reaching the end of its gas generation potential.

The report recommends the following actions:

- The addition of ten new gas and leachate extraction boreholes.
- Decommissioning of redundant boreholes.
- Further investigation into the leachate regime on site with a view to improvements in leachate management.

Regulatory Comment

The regulator would agree with the above recommendations, although it is not our remit to specify what works are necessary. The regulator will consider any works that ensure compliance.

Overall Conclusion:

In accordance with statutory guidance Circular 01/2006 and the provisions of section 57 of the Environmental Protection Act 1990, the investigation is deemed as suitable and sufficient. The investigations have received tacit approval of both the Environment Agency and DEFRA through the successful bid for funding and subsequent regulatory discussions.

It is the opinion of the regulator that significant pollutant linkages do not exist with which to formally determine the site as “Contaminated Land” under the provisions of the Environmental Protection Act 1990.

However, the following issues have been identified and will require to be rectified in order that due diligence can be demonstrated:

- Implementation of all recommendations as per Table 3 of the DSEAR Assessment and recommendations of the Biogas pumping trial report:

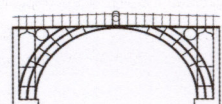


- Production and implementation of an updated site management plan to ensure that the site is adequately managed for the foreseeable future of the site. For the avoidance of doubt, this must put measures in place to address the excessive lateral gas migration, the excessively high leachate levels within the site, and is likely to include the advancement of ten new gas and leachate extraction wells within the site, as recommended by Biogas Ltd.
- Replacement of the elevated flare by a ground flare in accordance with EA guidelines (N.B regulatory discussions have taken place with the EA regarding waste management license for the flare, and the EA confirm that there is only a requirement for a license where ground gas electricity generation over 4MW is occurring). As such, a Waste Management License is not necessary in replacing the flare.

Iain Wheeler

Scientific Officer

11/12/2008





Environmental Health and Wellbeing
Manager

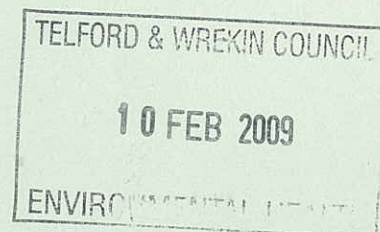
Adult Social Care

Darby House

P.O. Box 214

Lawn Central

Telford TF3 4LE



Fao Tony Higgins

Dear Tony

STONEY HILL LANDFILL SITE – CAPITAL WORKS

I refer to your letter of 10th December 2008 and draft reports that relate to the site investigation works carried out at the above landfill site using Capital Works funding. I have considered the report with respect to the investigation of the site and would comment that the format of the investigation and reporting seems appropriate and provides value for money.

I would reiterate the point that if you have not already done so, you may find it beneficial to consider "Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIa of the EPA 1990" in accordance with my previous e-mail to Iain Wheeler. If you require any more information on this matter please do not hesitate to contact the Environment Agency.

Yours sincerely

Keiron Finney
Technical Officer

Direct dial 01743 283529

Please ask for Keiron Finney ext 3529

Hafren House, Welshpool Road, Shelton, Shrewsbury, SY3 8BB.
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk



INVESTOR IN PEOPLE



From: Carr Robert (TWPCT) [mailto:Robert.Carr@telfordpct.nhs.uk]
Sent: 05 March 2009 16:40
To: Mercer, Ian
Cc: Woodward Catherine (T&WPCT); Andrew Kibble; Higgins, Tony
Subject: HPA assessment of T&W Council reports on Stoney Hill Landfill Site
Importance: High

Dear Ian

As requested we have reviewed the environmental reports you sent us regarding this landfill site with expert advice from the Chemical and hazards division of the HPA. Please see a copy of a letter from Andrew Kibble in this respect

From our review of the reports, there does not appear to be any significant risks to local people from this site.

However, it is important to appreciate that much information on air quality around the site has had to be predicted. For example, emissions from the flares are inherently difficult to measure and while the predicted results suggest little impact on local air quality, the current flare system is clearly limited and does not meet with modern standards. We strongly recommend that the current flare system is updated to a modern system and the air quality assessment be repeated. This should include an assessment of dioxin emissions and consideration of the impact on local food chains.

There is also some evidence of landfill gas migration in perimeter boreholes. While it is our opinion that this does not present an immediate risk, a commitment to regular monitoring and assessment it needed to ensure that further migration does not occur.

We recommend that the Council continue to adequately monitor and manage any landfill gas and leachate and, whenever it is reasonably practicable, ensure that any failures do not result in the release of substances which could adversely impact on public health.

Best wishes

Rob

Dr Rob Carr

Consultant in Communicable Disease Control

West Midlands North Health Protection Unit