

This letter report presents the results of the outstanding gas and groundwater monitoring visits, and should be read in conjunction with the previous geoenvironmental appraisal compiled by Sirius.

Gas and Groundwater Monitoring

As part of the Sirius Phase 1 ground investigation, gas/groundwater monitoring wells were installed within rotary boreholes RO1 to RO3 inclusive and window sample boreholes WS1, WS4 and WS5. On the second monitoring visit, only RO3 and WS1 remained operational.

Subsequently five rotary boreholes (RO101 to RO105 inclusive) were drilled to replace the damaged/destroyed monitoring wells. Engineer's exploratory hole records detailing monitoring well construction and strata descriptions, and an exploratory hole location plan (Drawing No. C4013/01, revision A) showing both the locations of the boreholes drilled as part of the Phase 1 works and the reinstatement works are attached to this letter.

The wells were monitored for concentrations of methane, carbon dioxide, hydrogen sulphide, carbon monoxide and oxygen, together with flow rates, using a GFM 430 gas analyser. Volatile organic compounds (VOCs) were monitored using a Photo Ionisation Detector (PID) on two occasions.

Gas monitoring was undertaken at atmospheric pressures of between 1001mb and 1032mb, and covered steady and falling pressure under a range of meteorological conditions and groundwater levels.

The gas monitoring results indicate non-detectable or very low concentrations of methane, carbon dioxide, hydrogen sulphide and carbon monoxide, with no detectable initial and steady state positive flows. Subsequently the overall ground gas regime can be assessed as Characteristic Situation (CS) 1, based on Situation A presented in CIRIA 665; necessitating no special precautions with regard to gas protection.

No VOC concentrations above the limit of detection (0.1ppm) were detected within the ground gas. Therefore, specific hydrocarbon protective measures are not required.

In accordance with the BRE Radon document (BR211) 2007 'Radon, Guidance on protective measures for new buildings', radon protection measures are not required for the proposed development on this site.

We trust that the above and attached is satisfactory and self explanatory and that you will forward this information for the appropriate regulatory approvals.

Should we be of any further assistance on this project, please do not hesitate to call.

Yours sincerely

Jim Wilson
Senior Engineer

For and on behalf of
Sirius Geotechnical and Environmental Ltd

Enc:

- Borehole records (RO101 to RO105 inclusive)
- 3 x gas/groundwater monitoring results (dated 03/03/2010, 09/03/11, and 23/03/11)
- Exploratory hole location plan (Drawing No. C4013/01, revision A)

Sirius Geotechnical & Environmental Ltd.

Russel House
Mill Road
Langley Moor
Durham
DH7 8HJ
t. 0191 378 9972
f. 0191 378 1537

4245 Park Approach
Century Way
Thorpe Park
Leeds
LS15 8GB
t. 0113 264 9960
f. 0113 264 9962

35 St Pauls Square,
Birmingham,
B3 1QX
t: 0121 232 4670
f: 0121 212 3363

