

B.1 TASK SUMMARY

This Appendix provides a report of the field works and laboratory chemical analysis undertaken to meet the objectives defined in Section 2 of the main report. The justification for the scope of works, sample locations and analytical suite are presented in the URS proposal 1941NG1111 (dated 16th February 2007), along with subsequent correspondence with the Environment Agency in Appendix A.

The soil and groundwater investigation undertaken as part of the additional measures required by the preliminary remediation statement¹ was undertaken as a series of tasks as summarised below:

- Task 1 Preliminary Works;
- Task 2 Trial Pitting/Drilling and Soil Sampling;
- Task 3 Shallow Groundwater Sampling and Levelling; and
- Task 4 Laboratory Analysis and Data Management

B.2 TASK 1 – PRELIMINARY WORKS

Prior to commencement of site works, a Health and Safety Plan was developed, URS approved subcontractors including: Joy Plant (groundworks and trial pit excavation), Global Probing and Sampling (soil bore drilling), and Survey Systems (Surveyors) were mobilised to site.

A site walkover was conducted on 1st March 2007 by representatives of URS, Rhodia and Huntsman. The scope of the site works was discussed, and in particular the identification of underground services in the investigation area. Once this had been completed, the position of each investigation location was agreed and marked out. It was agreed that should a location require moving, the prior consent of Rhodia and/or Huntsman would be requested.

Mobilisation to site occurred on 2nd March 2007. Following the discussions held during the site walkover, the Rhodia supervisor issued a permit, authorising intrusive works at each of the identified locations.

Prior to undertaking site investigation works all personnel from URS or its sub contractors (Joy Plant, Global Probing and Sampling, Survey Systems) were given a safety induction by URS's Site Safety Officer (SSO).

¹ Former Albright and Wilson Works, Whitehaven, Cumbria: Site Remediation Statement. Rhodia UK Ltd, URS. May 2006 (ref: 44319877/R2234.B01)

B.3 TASK 2 – SITE WORKS

B.3.1 Investigation Locations and Rationale

The rationale for the number and locations of trial pits and soil borings and the suite of laboratory chemical analysis is presented in Appendix A and was based on an approximate simple grid pattern to allow delineation of the previously identified potential contaminants of concern, and provide confidence in providing representative data on the entire condition of the plot including for those areas in which there was no data currently available. The sampling locations are indicated on Figure 3.

B.3.2 Trial Pitting

Trial Pitting was undertaken between 7th March 2007 and 8th March 2007. Prior to excavation, each location was cleared with a Cable Avoidance Tool (CAT Scan). The presence of thick concrete covering a small part of the area of Plot G it was necessary to use a hydraulic breaker attached to a backhoe excavator to advance through. In total 8 trial pits of approximate area 1m x 3.5m were advanced using a mechanical backhoe excavator to a maximum depth of 6.6m bgl.

Soil inspection and sampling were undertaken as described in Section 3.4. The excavations were discontinued on contact with natural ground that appeared uncontaminated or on bedrock. The trial pits were backfilled with arisings in the reverse order to their excavation, then compacted using the bucket and tracks of the excavator.

B.3.3 Drilling Works

Drilling works were conducted on 7th March 2007. Prior to excavation, each location was cleared with a CAT Scan. Three boreholes (WS760G, WS766G, and WS768G) were advanced to up to 3.0m bgl (WS760G), 4.0m bgl (WS768G), and 6.6m bgl (WS766G). This technique drives a metal sampling tube 100mm in diameter and 1000mm in length containing a single use acetate liner into the ground using a hydraulically driven falling weight. A metal casing is driven into the ground along with the sampling tube, facilitating the extraction of the sample core after each successive metre, and preventing the collapse of the borehole sides and subsequent cross contamination of the soils yet to be sampled.

The process of inspection of the soil cores and collection of samples is described in full in Section 3.4.

Groundwater monitoring wells were installed in each of the three locations, using 50mm HDPE casing and screen, a geosock sleeve, an inert gravel pack and bentonite seal. Top hat type covers were used in some areas to reduce the potential for the loss or damage to the borehole, given the likelihood of heavy plant machinery operating in the investigation area during future groundworks. Details of the construction of each of the monitoring wells is provided in the borehole logs included in Appendix C.

B.3.4 Soil Inspection and Sampling

The URS field engineer logged the geological sequence observed as the excavation progressed. To assess the potential for contamination, soil samples were taken at regular intervals for headspace analysis (typically every 0.5m). Additional samples were taken for headspace analysis if there was any visual or olfactory evidence of contamination, or where there were pertinent changes in the geology. These samples were screened using a photoionisation detector (PID meter) fitted with a 10.6 eV bulb to assess the potential for chemical impact from volatile hydrocarbons.

Soil samples were collected at a variety of depths from both contaminated and uncontaminated horizons, from the Made Ground and from the natural ground to provide a robust, valid and comprehensive assessment. These were placed directly into containers supplied by the laboratory, and stored under chilled conditions prior to dispatch to the URS approved laboratory (Alcontrol Geochem).

B.4 TASK 3 – GROUNDWATER SAMPLING AND LEVELLING

B.4.1 Groundwater Sampling

Prior to sampling, depth to water (or free phase oil product below ground level) was measured in each well using an oil/water interface probe. WS760G and WS768G were found to be dry, and therefore no groundwater samples were obtained. Groundwater sampling from the remaining well was undertaken on 12th March 2007.

B.4.2 Levelling

A levelling survey of each of the investigation locations relative to Ordnance Datum and the national grid co-ordinates was conducted by a specialist sub-contractor (Survey Systems) between 12th March and 14th March 2007. For the monitoring wells, the depth to the top of the pipe and the cover level was measured to use in conjunction with the groundwater data to determine the groundwater flow direction.

B.5 TASK 4 - LABORATORY ANALYSIS AND DATA MANAGEMENT

As stated in Section 3.1.2 of the Remediation Statement¹, the final analytical schedule was determined by the ground conditions at the site during the investigation. Leachate samples were also scheduled from the soil samples in order to gain an understanding of the potential concentrations that may be leached from the soil (and subsequently enter the groundwater).

The analytical suite was determined by the contaminants of concern identified within the conceptual site model derived by Copeland Borough Council, and the further information obtained through URS's Phase II investigation as well as review of the historical processes undertaken at the site. The rationale for the final analytical suite is discussed in the report. The samples submitted for analysis, together with the full analytical suite are given in Table 1.