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 3033251 (dated 23rd June 2006), 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 statement[1] 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;

Task 4 Laboratory Analysis and Data Management

2. TASK 1 – PRELIMINARY WORKS

Prior to commencement of site works, a Health and Safety Plan was developed. The plan was then reviewed and authorised by Mark Smallbones (Health and Safety Representative for the Manchester Office), Andrew Doerr (Project Manager), and Frank Wigley (Contract Manger). URS approved subcontractors were mobilised, including: Trial Pitting Operators (Lawsons), Drilling Firm (Global Probing and Sampling), and Topographic Levelling Team (Survey Systems).

A site walkover was conducted on 18th July 2006 by: the Project Manager, the URS field engineer and representatives of Rhodia and Huntsman. A discussion was held to assess the scope of the site works. Central to this discussion was the identification of underground services in the area. Once this had been completed, each 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 24th July 2006. Following the discussions held during the site walkover, the Rhodia supervisor issued a permit, authorising intrusive works at each of the identified locations.

The Site Safety Officer (SSO) conducted a Health and Safety induction with the subcontract Trial Pitting Operator (Lawsons) and Drilling Operator (Global Probing Sampling), discussing safe methods for the intrusive works. The site works commenced at 10am on 24th July 2006 and were completed on 31st August 2006.

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

3. TASK 2 – SITE WORKS

3.1. Investigation Locations and Rationale

The locations of the trial pits and soil borings were allocated based on an approximate simple grid spaced pattern to allow delineation of the previously identified potential contaminants of concern, and 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.

3.2. Trial Pitting

Trial Pitting was undertaken between 1st August 2006 and 4th August 2006. Prior to excavation, each location was cleared with a Cable Avoidance Tool (CAT Scan). The presence of thick concrete covering much of the area of Plot A meant it was necessary to use a hydraulic breaker attached to a backhoe excavator to advance through. Following the breaking through of concrete, 30 trial pits of approximate area 1m x 3.5m were advanced using a mechanical backhoe excavator to a maximum depth of 4m 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 wheels of the excavator.

3.3. Drilling Works

Drilling works were conducted between 16th August 2006 and 18th August 2006. Prior to excavation, each location was cleared with a CAT Scan. Four boreholes (WS501A – WS504A) were advanced to up to 5.8m bgl using window sampling technique. 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. Equipment was decontaminated between locations.

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 three of the four locations, using 50mm HDPE casing and screen, an inert gravel pack and bentonite seal. Top hat type covers were used 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 groundworks0. One borehole (WS501A) was not installed with a monitoring well due to refusal on reinforcement bars at 1.4m bgl and was instead reinstated using bentonite.

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, headspace analysis was conducted on samples selected from horizons where there was visual or olfactory evidence of contamination, or where there were pertinent changes in the geology. Where these indicators were not present, samples collected from regular intervals for headspace analysis (typically every 0.5m). These samples were screened using a photoionisation detector (PID meter) fitted with a 10.6 keV 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).

4. TASK 3 – GROUNDWATER SAMPLING AND LEVELLING

4.1. Groundwater Sampling

The groundwater monitoring round was conducted on 30th August 2006. Measurement of the depth to water (or free phase oil product below ground level) was conducted using an oil/water interface probe. However, the four wells installed in Plot A were found to be dry, and therefore no groundwater samples were obtained.

4.2. Levelling

A levelling survey of all locations relative to Ordnance Datum and the grid co-ordinates was conducted by a specialist sub-contractor (Survey Systems) between 30th August 2006 and 31st August 2006. 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.

5. TASK 4 - LABORATORY ANALYSIS AND DATA MANAGEMENT

As stated in Section 3.1.2 of the Remediation Statement[1], 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.