



Proposal

# **Plot A Environmental Site Investigation & Assessment**

At the former Albright and Wilson  
Works, Whitehaven, Cumbria

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*Prepared for:*

Rhodia UK Ltd

*Prepared by:*

URS Corporation Limited

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Figure 1 Phase II Exceedance of Assessment Criteria for Soils

Figure 2 Phase II Exceedance of Assessment Criteria for Groundwater

Figure 3 Area of Plot A

Figure 4 Proposed sampling locations

## **1. INTRODUCTION**

### **1.1. General Information**

This proposal presents the objectives, outline scope of works, project schedule, costs and conditions of an environmental site investigation in an area identified as Plot A at the Rhodia UK Ltd. facility in Whitehaven, Cumbria. This proposal has been prepared by URS Corporation Ltd (URS) at the request of Rhodia UK Ltd (Rhodia).

### **1.2. Background Information**

Copeland Borough Council identified the site, excluding the Hutbank and Ufex licensed waste disposal areas, as “a special site contaminated land” in terms of the Environmental Protection Act 1990, Part IIa (as amended) and the Contaminated Land (England) Regulations 2000 (letter of 10 May 2005 from the Council to the Company Secretary (Rhodia)). Under a separate commission, URS is preparing a Remediation Statement explaining what action is to be taken to address the significant pollutant linkages at the site.

The previous URS Phase II Investigation (ref; 44319623 / R2037) at the site assessed the potential significant pollutant linkages and refined the conceptual site model. The potential significant pollutant linkages considered to exist were modified from Copeland BC's determination, although this modification has yet to be accepted by the Environment Agency. Areas where further investigation was required in order to fully understand the pollutant linkages were also identified, and Plot A is one of those areas.

URS has undertaken a number of investigations on the Rhodia site, formerly Albright & Wilson, since the mid 1990s. During this period, Rhodia's operations on the site have diminished and associated former operational buildings have been decommissioned. The most recent on-site processes related solely to the surfactants business, divested to Huntsman. Huntsman, however has significantly reduced its on site processes, where demolition is currently being undertaken. URS' has an extensive understanding of the contaminated land issues at the site, developed primarily through the works detailed in our following reports:

- Further Monitoring Works and Risk Assessment Approach for the Environment Agency (report dated 21 January 2005, Issue No 2, 44577-045-787/R1771-B02);
- Additional Investigation at the Former Albright & Wilson Works, Whitehaven (report dated 8 August 2003, reference R1550-C01/44557-033-787/ARC/JMC/pp);
- Refining the Conceptual Site Model at the former Albright & Wilson Facility, Whitehaven (report dated 20 December 2003, reference R1377C/44557-032/787/JRM/pp);

- Source Audit at the Former Albright and Wilson Facility, (report dated 21 March 2002, reference R1131B/44557-026-787/JRM);
- Phase II Soil and Groundwater Investigation (report dated 4 February 2002, reference R1107-C01/44557-021-420/JRM);
- Final Report Environmental Audit Albright & Wilson Whitehaven, England (report dated February 1995); and;
- Phase II Investigation and Environmental Assessments, Former Albright & Wilson Works, Whitehaven, Cumbria (report dated 23 June 2005, reference 44319623 / R2037).

### **1.3. Site Investigation Area - Plot A**

The previous URS investigation identified a potential pollutant linkage to controlled waters from naphthalene and chloromethane in soil (Figure 1) and surfactants in shallow groundwater (Figure 2) in an area of the site located adjacent to the northern boundary. For the purpose of focusing the site investigation on the characterisation and delineation of these sources, zoning the area of interest is proposed. The site investigation area is approximately rectangular in shape and is identified as Plot A (Figure 3). The plot area is based on encompassing the lateral dimensions of the identified potential contaminant plumes. The plot lies adjacent to the northern site boundary, close to the former surfactant smoothing chambers (cathedral) and extends southward toward the former cooling towers. The former dry and wet salts area and Croft/Ladysmith Pit and coke works are located to the east and the former alabaster works and fatty alcohol plant to the west. The estimated area of the plot is 3.62 hectares.

## **2. PROJECT OBJECTIVES**

The proposed investigation will draw on the data collected and analysed from previous studies, supplemented by new data and analysis specifically orientated to enable appropriate Remediation Actions to be developed and costed. The key objectives of the proposed investigation are therefore to undertake the following;

- To assess further the likely extent and significance of contamination in shallow soil and groundwater identified during the previous assessments in the specified area of interest;
- To provide additional data on potential further compounds not previously detected but which may be considered to be present;
- To provide comprehensive and robust data to allow conceptualisation and characterisation of the site area as far as possible;

- To revisit existing data and to supplement this with additional information from the proposed investigation;
- To revise and develop the current Conceptual Site Model;
- To review all the data gathered from the assessments undertaken in the area of interest and to review this against the existing controlled waters and human health site specific risk based screening levels;
- To provide a preliminary evaluation of the need for, and scope of, potential remedial options (if considered appropriate) together with an estimation of potential remedial methodologies and costs.

### **3. SCOPE OF WORK**

#### **3.1. Introduction**

Although there have been a number of assessments at the Whitehaven site, it is considered that due to the paucity of data available in the area of interest the proposed investigation will be designed as a 'main stage investigation'<sup>1</sup> to inform future management decisions or potential future remedial investigation and design.

#### **3.2. Assessment Guidance and Strategy**

Various UK guidance documents have been consulted in developing an appropriate sampling strategy. These include various Contaminated Land Research (CLR) Reports such as CLR 4 ("Sampling Strategies for Contaminated Land", published in 1994) and CLR 7 ("Assessment of Risks to Human Health from Land Contamination", published in 2002), the Environment Agency R&D Technical Report P5-066/TR (Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination) and the British Standard BS10175:2001 (Investigation of potentially contaminated sites – code of practice). It is intended that the proposed investigation is undertaken in compliance with the technical guidance so that good practice is followed and that valid and robust data are provided for informing site management decisions or for assisting in developing scope for potential future supplementary investigation and/or remedial options appraisal and design.

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<sup>1</sup> Detailed in 'Secondary Model Procedure for the development of Appropriate Soil Sampling Strategies for Land Contamination' EA R&D Technical Report P5-066/TR; and, 'Investigation of Potentially contaminated Sites – code of practice' BS 10175:2001

### 3.3. Summary of Approach

The findings from the previous investigations at the Whitehaven site indicated potential significant pollutant linkages from detected concentrations of naphthalene, chloromethane and surfactants detected in Plot A to the Irish Sea controlled waters receptor. Naphthalene and chloromethane were detected in soil samples at concentrations which exceeded the modelled controlled waters Tier 3 criteria. However due to no detectable concentrations of naphthalene or chloromethane being reported in groundwater it was considered plausible that the partitioning of soil contamination to water may have been an overly conservative estimate of potential risk. Surfactants (analysed as methylene blue active substances – MBAS) detected in both soil and groundwater samples were reported at concentrations which exceeded Tier 3 controlled waters screening criteria and it was considered that further assessment and characterisation of this contamination was necessary. In addition to these contaminants previously identified access constraints prevented the achievement of an adequate sampling density during the previous investigation. The opportunity to collect additional data for the assessment of potentially unidentified contaminants will be taken and will assist in the characterisation of site wide issues such as the distribution of metal compounds across the site.

### 3.4. Site Investigation Rationale – Plot A

There are a total number of 17 existing borehole locations in the area of interest for which there is data available. A total of 12 of these locations were drilled, of which, a total of five were installed with shallow monitoring wells. The remaining five locations were trial pits in which monitoring wells could not be installed. The estimated area of Plot A is 3.62 hectares. It is considered reasonable by URS, based on both technical guidance and professional judgement, that a total number of an additional 35 intrusive sampling locations will be adequate in providing sufficient data in support of future site assessment management decisions. The additional locations would bring the total number of sample points in this area of the site to 52, giving a target sampling density of approximately 14 locations per hectare. The locations will be based on an approximate simple grid spaced pattern for which it is anticipated will allow delineation of the existing identified contaminants of concern and confidence in providing representative data on the entire condition of the plot and for those areas in which there is no data currently available. The proposed sampling locations are presented on Figure 4.

In addition to the lateral spread of contamination across the plot, the vertical distribution of potential contaminants of concern will be assessed through observations and field measurements during site work and through the collection of samples from a variety of depths. Not only will this assist in the vertical assessment of potential contaminant distribution but also in the conceptualisation of the sub-surface environment and the significance of potential pollutant migration pathways. It is understood from previous investigations in this area of the site that underlying bedrock is located within 5m of ground surface and therefore it is proposed that a maximum depth of 5mbgl will be achieved at each intrusive location or refusal on obstructions/bedrock. It is not proposed to drill monitoring boreholes into the bedrock, because there is already a deep

groundwater monitoring programme at the site. This programme is in the process of characterising deep groundwater contamination and further boreholes are not necessary.

It should be noted that both lateral and vertical sampling may be dependent upon the underlying ground and geological conditions encountered at the site and that exploratory locations may need to be revised while undertaking intrusive site investigation work. It is known to URS from previous investigations at the site that there are likely to be underground features such as building foundations and concrete slabs which may inhibit or prevent the advancement of exploratory locations. As such it is considered that the intrusive work will initially commence with exploration using a mechanical backhoe excavator which, it is anticipated, will advance through locations of difficulty and allow a detailed visual assessment of subsurface conditions for the investigation. Following this, it is considered possible that key areas of potential concern may be identified and targeted for further investigation. It is also understood that decommissioning works are currently being undertaken in this area and therefore flexibility is required for the site programme, as the schedule for the intrusive work may be dependant on its completion.

It is therefore proposed that a total number of 30 trial pits will be excavated and a further 5 soil borings will be drilled which will be installed with a groundwater monitoring well. It is considered that these locations will allow assessment of the vertical and lateral distribution of potential contamination and soil and groundwater conditions beneath the area of interest.

### **3.5. Task Summary**

The scope of works for the investigation has been divided into sub-tasks as follows:

- Task 1 – Project Management, Meetings, Health & Safety;
- Task 2 – Trial Pitting/Drilling & Soil Sampling;
- Task 3 – Shallow Groundwater Sampling;
- Task 4 – Laboratory Analysis and Data Management;
- Task 5 – Refining the Conceptual Site Model;
- Task 6 – Review and update existing conclusions and recommendations; and
- Task 7 – Reporting.

The principal tasks are discussed in more detail in subsequent sub-sections.

#### **3.5.1. Task 1 – Project Management, Meetings, Health & Safety**

This task includes the preparation of Health & Safety plans for the investigation, mobilisation of subcontractors, project administration and invoicing throughout the



duration of the project. An allowance has been made for one site visit to mark out suitable locations and confirm suitable access for the intrusive work. URS will consider whether the site work will be subject to the Construction (Design and Management) Regulations (1994) and will accommodate this in the Health & Safety Plan, if required.

No allowance has been made for any further site visits or for meetings between URS and Rhodia or any third parties. Should this be required then this will be agreed with Rhodia and charged in accordance with our agreed rates on a time and expense basis.

### **3.5.2. Task 2 – Drilling/Trial Pitting & Soil Sampling**

#### **Preliminaries**

Prior to commencing site work, borehole and trial pit locations will be identified, marked and finalised by URS and Rhodia in accordance with the agreed Health and Safety Method Statement procedures and flow chart, provided in the URS Health and Safety Plan. In summary, this comprises URS initially providing Rhodia with a detailed proposed location plan. Further to review by Rhodia (and Huntsman) and the potential relocation of positions, a site walkover by the URS project team to finalise, agree and mark out borehole locations with a Rhodia employee (and Huntsman employee, if required) will be completed. Initial scanning with a Cable Avoidance Tool (CAT) will be carried out in conjunction with consultation of the utility plans. A permit will then be issued by Rhodia, detailing each authorised location. The permit will include an agreement on the requirement of hand digging for each specific location, and to what depth digging will be performed. URS does not accept responsibility in the event of damage to buried services whose exact locations have not been brought to our attention before intrusive work begins. Prior to site works commencing, a Health and Safety Plan covering all field tasks to be carried out will be developed (as part of Task 1).

#### **Trial Pitting**

It is proposed that soil sampling is best achieved in areas of potential difficult subsurface conditions by trial pitting. This is a relatively rapid technique for investigating shallow subsurface soils whilst the pits allow better characterisation of geology, potential voids and observations of contamination. Trial pitting does cause disruption to a larger area of ground and settlement can occur. It is assumed that Rhodia would have no objection to trial pitting in these areas. Trial pitting will be carried out using a tracked mechanical excavator. This will be equipped with a breaker for use in surfaced areas. It is anticipated that the excavations will extend up to 5m depth or refusal on obstructions/bedrock. An allowance has been made to excavate up to 30 trial pits over a 7 working day period.

Following completion of trial pitting, the scope for drilling work will be completed. This will include finalising the positions of sampling locations and laboratory analysis.

#### **Drilling**

It is proposed that drilling will be undertaken with a window sampling technique. Boreholes will be advanced to a maximum of 5m depth, where possible, although previous investigation suggest that many locations are likely to have refusals at shallower depth (due to obstructions and/or bedrock). An allowance has been made to drill 5 boreholes over a 2-day period, each completed to monitor shallow groundwater. Where the advancement of boreholes does not reach the required depth the location will be backfilled with arising and/or bentonite grout. Groundwater monitoring wells will be installed with 50mm HDPE casing and screen. Boreholes will be completed with an above ground cover, painted a visible colour and surrounded by temporary fencing to prevent potential loss of integrity due to heavy vehicle movements. Waste derived from drilling will be stockpiled on site further to laboratory analysis, after which a decision on the destination of the waste will be made. No costs have been included in this proposal for the disposal of this waste.

During drilling and trial pitting, soil samples will be screened at regular intervals for potential organic contamination using a Photo Ionisation Detector (PID) to assist in the selection of soil samples. The key organic contaminant of concern, naphthalene, has an ionisation energy of 8.13eV and therefore a PID comprising a 10.6eV lamp will be used. Geological logging, recording of water strikes and of visual and olfactory indications of contamination will be carried out during drilling/trial pitting.

Soil samples will be taken for laboratory analysis from the proposed trial pits and boreholes to supplement the existing data set. These will be taken from a range of depths, in order to satisfy the requirements for a robust, valid and comprehensive assessment. It is proposed to take soil samples from each location for laboratory analysis (the proposed analytical schedule for these samples is presented as Task 4) including leachate testing for heavy metals in order to evaluate the leaching potential for contaminants into the underlying groundwater. In addition, duplicate soil samples and one field blank will be submitted to the laboratory for QA/QC purposes.

### **Surveying**

New monitoring wells installed as part of this task will be surveyed for relative height in relation to the existing monitoring well network. Measurements will be made to the top of the well casing to allow groundwater elevations and flow direction to be calculated.

### **3.5.3. Task 3 – Shallow Groundwater Sampling**

Groundwater samples will only be taken from the new shallow monitoring well network. It is understood that there are 5 existing wells located within Plot A, however the integrity of some or all of these locations are likely to have been impaired by demolition operations undertaken in this area and therefore it is considered that these locations are not suitable for sampling. The proposed analytical schedule for the groundwater samples is presented in Task 4.

Depth to water measurements will be made to allow groundwater flow direction to be determined. The wells will be purged of three times their volume prior to sampling. Field parameters of pH, temperature, Electrical Conductivity and Redox Potential will be taken during purging and sampling of the wells and duplicate groundwater samples and one field blank will be submitted to the laboratory for QA/QC purposes.

### 3.5.4. Task 4 – Laboratory Analysis & Data Management

The table below provides an indication of the collective analytical schedule for the proposed URS investigation. A maximum number of two soil samples will be analysed at each sampling location. For shallow groundwater sampling, it has been assumed that each of the 5 new wells will be sampled.

#### Proposed Analytical Schedule

Analyte	Proposed Analytical Schedule		
	Soil	Shallow Groundwater	Leachate
Surfactants (MBAS)	35	8*	70
Heavy Metals	20	8*	20
Total Cyanide	20	5	20
Ortho Phosphate	70	8*	50
Total Phosphate	70	8*	50
Sulphate	20	5	20
pH	70	8*	70
TPH CWG	15	8*	15
TPH (aliphatic/ aromatic split)	15	-	15
VOCs	20	8*	-
SVOCs	50	8*	70
PCBs	10	-	10
TOC	2	-	-
PSD	2	-	-
Ammonium	35	5	70
Nitrate	35	5	35
Total Organic Nitrogen	35	5	70

#### Note

- \*include QA / QC
- may be subject to change further to information received from Rhodia re. surfactant analysis

It is proposed to use Alcontrol Geochem of Chester as the laboratory subcontractor for these works. Alcontrol are an MCERTS accredited and URS approved laboratory, who have been commissioned for previous Whitehaven investigations, thus maintaining consistency. Allowance has been made for laboratory analysis to be undertaken on a standard turnaround time basis (usually 10 working days). However, a faster turnaround time can be arranged although this will invoke an additional surcharge to secure this service.

The field measurements, laboratory data and levelling data obtained from the previous and proposed investigations will be collated into a database to allow assessment and

reporting to be undertaken. Each new sampling location will be accurately positioned on a scale drawing using the data obtained, together with the locations from the previous investigations within Plot A.

### **3.5.5. Task 5 – Refining the Conceptual Model**

A refined conceptual model will be produced using the additional geological and hydrogeological observations made in the field and the laboratory analysis test results.

Once the conceptual model has been refined, all significant pollutant linkages (source, pathway, receptor relationships) will be reviewed and the plausibility assessed (see below).

### **3.5.6. Task 6 – Remedial strategy development**

The central component of the proposed assessment is to develop appropriate remediation actions consistent with the requirements of Part IIA. In order to achieve this objective, it will be necessary to review all the data available for this area of the site, to refine the conceptual site model (as part of Task 5) and to assess the plausibility of previously identified and potential additional pollutant linkages. It is possible that the additional data may change our conceptual understanding of the pollutant linkages at the site and therefore conclusions and recommendations for future management will have to be reviewed and updated accordingly.

A draft remedial strategy for Plot A suitable for insertion into the Remediation Statement will be prepared. Aspects of Plot A remediation may be dependent on actions to be taken on other areas of the site, and these will be identified. It is envisaged that the remedial strategy will remain in draft until all or most of the Assessment Actions are complete, after which full agreement on the Remediation Actions will be negotiated. This final stage is not included in the scope of this proposal. It is further assumed that the investigation for Plot A will occur at more or less the same time as that for Plot B (Coke works / Imidazoline plant) and Plot C (TPH hotspot / North Pond), and therefore that remediation strategies for these areas will be under development.

The draft remedial strategy will be sufficiently detailed to identify recommended methodology, locations requiring remediation, approximate quantities, timescales, contaminants required to be remediated and standards of remediation proposed. The strategy will not include detailed design, or feasibility trials if such are required.

Outline costs for the draft remedial strategy will be produced, including any additional delineation, detailed design and/or trials.

### **3.5.7. Task 7 – Reporting**

Following receipt of the laboratory data and the review of the conceptual site model and previous conclusions and recommendations, a report will be presented which will include the following:

- Presentation of the project objectives;
- A brief description of the scope of works;
- Presentation of collated laboratory analysis data from the previous and current investigations in tabular format;
- Figures illustrating the sampling locations, inferred groundwater contours/flow direction, and cross sections; and
- Borehole logs.

Following completion of Tasks 1 to 6, the interpretive components of the report will be prepared which will include the following elements:

- Presentation of qualitative findings;
- A revised Conceptual Site Model and evaluation of significant pollutant linkages;
- The methodology and results of revisiting the previous risk assessments;
- Figures illustrating the refined conceptual model;
- Conclusions with respect to the significance of the investigation and assessment findings;
- Draft remedial strategy and outline costings.

The draft report will be issued to Rhodia in electronic format for review. In addition, a hard copy and an electronic copy will be sent to the Environment Agency for review. Following one set of consolidated comments, two hard copies and one electronic copy of the final report will be issued to Rhodia within three days of receipt of comments/the meeting. Additional copies for potential third parties can be prepared on request and will incur a cost based on a time and expense basis. The production of the report does not include meetings with Rhodia or the authorities. Such out of scope meetings would be charged on a Time & Expense basis.

### **3.6. Project Team**

The team will comprise the following key staff:

- Sophie Bowtell, Project Director;
- Frank Wigley, Overall Project Manager, responsible for co-ordination of all Whitehaven work for Rhodia;
- Matt Logan / Andrew Doerr, Sub-Project Manager - assistance with project management, site investigation and reporting.

These staff will be supplemented from field staff and risk assessors during the course of the studies. Curriculum Vitae of the staff can be provided on request.

### **3.7. Proposed Schedule**

It is anticipated that work will begin approximately 1 week following authorisation, however it is requested that the start date is flexible according to the status of demolition within the site investigation area. The production of a draft report is anticipated to be produced 9 weeks following authorisation. Further to comments being returned to URS, the report will be finalised in a further week.

## **4. CLOSURE**

URS Corporation Ltd would like to thank Rhodia for giving us the opportunity to present this proposal. Should you have any queries or wish to discuss any aspects further, please contact the undersigned. If you wish us to undertake this work for you, we should be grateful if you would provide us with a written instruction. If you wish to authorise only part of the works please indicate in writing which component studies you wish URS to complete.

Signed on behalf of URS Corporation Ltd

**Frank Wigley**  
Proposal Manager

**Sophie Bowtell**  
Proposal Director