Crest Strategic Projects Limited/ Persimmon Homes (Wessex) Limited

Albright & Wilson Decontamination, Portishead

Final Decontamination - Zone 5

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1.0 INTRODUCTION

1.1 General

This report covers the verification of the decontamination of Zone 5 of the Albright & Wilson site at Portishead as defined by the Schedule of Decontamination Works and shown on Figure 1. The bulk of the demolition work was carried out in December 1998 and the filling in the Spring and Summer of 1999.

1.2 Schedule of Decontamination Works

The Schedule of Decontamination Works (SDW) referred to in this document is Revision J of the Schedule of Decontamination Works issued by Ove Arup & Partners in July 1997. The SDW subsequently formed part of the Section 106 agreement for the Portbury Park development referred to as 'the Albright & Wilson Works', and was agreed to by North Somerset Council, Albright & Wilson, the developers and Bristol City Council, the landowners.

The standard of decontamination as verified by this report is as set out in the SDW, with agreed variations as detailed in 1.7 below.

Section 10.0 of the SDW, covering the decontamination of Zone 5, can be found in Appendix A.

1.3 History of Zone 5

Zone 5 was mainly a concrete structure over the dock and a muddy foreshore. The structure formerly carried rail lines on which raw materials, anthracite, silica/pebbles, limestone and rarely phosphate rock, were brought into the works and phosphorus was carried away in special tankers after being loaded adjacent to the Process House.

The structure was of in situ and precast concrete construction with a solid deck with local drain holes and the ground on the landward side was filled level with the top.

From about 1908 until they were cleared away in 1952, there were two wooden dolphins or docking jetties at the north end. Ships bringing oil to the refinery which formerly stood at the north end of the Albright & Wilson site at one time moored against these to load or unload. Old photographs show that these were in a poor state in the early 1950s and several of the timber piles had rotted or been eaten through at the mud line.

Albright & Wilson's works were built in the early 1950s and Zone 5 become part of Wharf 3 Portishead Dock. This was a time of materials shortages and the site engineer recalled that the timber piles beneath mud level were in good condition, so they were pulled out, sawn up and used for formwork in the construction works. From the archive of construction record photographs it appears that the main jetty to the west was built first and the 16" square precast concrete piles for the rest of the structure, which infilled between the site proper and the process buildings and the docks, were driven by frames standing on the dock.

1.4 Previous Decontamination Works

Apart from removing the rail lines which formerly ran over the bulk of Zone 5 and some phosphorus storage tanks adjoining the process house, no decontamination works as such had been undertaken by Albright & Wilson prior to the present exercise.

1.5 End Use

The end use of this part of the site is, at the time of writing (February 2001), still not confirmed but it is probable that, after completion of backfilling and construction of a new retaining structure of some sort, the area will be redeveloped, in part at least, for residential use.

1.6 Method Statements

The initial method statement for Zone 5 (PH/JH/021/98) was issued to Ove Arup & Partners (OAP) and North Somerset Council (NSC) on 19 November 1998 and is enclosed as Appendix B. North Somerset Council circulated queries from their advisors, the University of Birmingham (UoB) on 1 December, and this and Ove Arup & Partners' response dated 18 January 1999 is also included in Appendix B.

1.7 Agreed Amendments to the Schedule of Decontamination Works

An exchange of correspondence regarding the cut off level of the dock piles is included in Appendix B. It was agreed that the piles should be cut down to within 150mm of normal water level and that the positions of all piles should be surveyed in for future reference. The need to backfill the mud slope to its original profile and cap with granular material was also waived by verbal agreement as the area was to be filled to well above water level with imported material.

1.8 Area of Zone 5

The location of Zone 5 is shown on Figure 1 and it occupies parts of Grids E8-18 and F8-18.

2.0 DECONTAMINATION OBJECTIVES

The original objectives of the Zone 5 decontamination were as follows:

(a) Remove that part of Wharf 3 not required as part of the future development.

(b) Removal of all elemental phosphorus with practical minimum disturbance to the remaining Wharf 3.

(c) Demonstrate that remaining structures are clean of process waste.

(d) Demonstrate that the mud slope and dock bed adjacent to the structures is free from process waste and demolition materials.

(e) Demonstrate that the dock edge is clear of obstructions to piling.

(f) Cap clay and other materials above water line with 150mm minimum of Class 6F2 material.

As mentioned in Section 1.7, objective '(f)' was waived.

2.1 Meeting the Objectives

Albright & Wilson's Method Statement PH/JH/021/98 (Appendix B) describes the methods used to clear and decontaminate Zone 5. The individual objectives are addressed below, including the methods of verification and recording, with reference to further details and records within the report.

(a) Remove part of Wharf 3

Identification:	Visual
Recorded:	Daily log sheets, EC diary
Reference:	Grid Decontamination Sheets (GDS) Appendix D
Verified:	Visual

(b) Remove elemental phosphorus.

Identification:	Visual
Recorded:	A&W log, EC diary
Reference:	GDS Appendix D
Verified:	Grid sampling, sample referenced on GDS

(c) Demonstrate that remaining structures are clean of process waste.

Identification:	Visual
Recorded:	EC diary

(d) Demonstrate that mudslope and dock bed to be free of process waste and demolition materials.

Identification and Action:	Visual identification of rubble and waste
Recorded:	Daily log sheets, EC diary
Verification:	Dock mud sampled, sample numbers included on GDS.
Reference:	GDS (Appendix D) and Test Results (Appendix C)

(e) Demonstrate that dock edge is clear of obstructions to piling

Identification:	Visual
Recorded:	EC diary
Variations:	See 1.7, piles left in situ

(f) Cap clay and other materials above water line

Variations:	Waived, see 1.7

2.2 Identification of Major Contaminants

Material	Identification	Verification
Calcium Silicate Slag	*Visual:* Bluish-grey angular gravel, sometimes cemented, mainly encountered in distinct strata and pockets.	>10cps on hand held rate meter.
Phosphate Rock Fines	*Visual:* Off-white/pale brown sub-rounded sandy gravel, mainly encountered in distinct strata and pockets.	>10cps on hand held rate meter.
Yellow Phosphorus	*Visual:* Ignites and/or fumes on exposure to air.	On-site lab testing as per standing instructions (Appendix E)
Red Phosphorus	*Visual:* Distinctive red colouring *Mechanical:* Ignites and fumes when agitated, particularly on mechanical screening.	Sampling as per standing instructions (Appendix E).
Hydrocarbons	*Visual and Olfactory*: Black viscous appearance, "rainbow sheen" to standing water, "oily smell".	Sampling as per standing instructions (Appendix E). Offsite testing to establish TPH and PAH content.

3.0 DECONTAMINATION

3.1 Demolition

Prior to the works commencing, the dock water level had been reduced by 1m. The dock structure was broken up by a hydraulic excavator fitted with demolition shears which used the precast concrete planks and other members to form a 'corduroy' track for access.

An access ramp was formed at the north end of the process house using crushed concrete. A normal excavator and dumper then removed the debris. It was piled against the west side of the silos to the south where it formed part of the access ramp to permit demolition of that structure. This work was undertaken by R M Penny Limited between November and December 1998. Subsequently the steel elements were removed and the concrete crushed and used as capping elsewhere on the site.

More substantial structures at the north end of Zone 5, including a railway wagon tippler and hopper, were broken out later using an excavator mounted hydraulic 'pecker'.

3.2 Phosphorus, Process Wastes and Demolition Works

Apart from some construction debris, no phosphorus or process wastes, ie slags or phosphate rock fines, were originally found in the structure or on the mud beneath. Whilst most of the structure was suspended over the water and mud, at the north end ground level had been raised during construction by black gravel sized clinker ash, probably from the original coal-fired Power Station A on the other side of the dock.

Sizable debris arisings from the demolition of the wharf was removed along with any rubble which had fallen onto the mud during demolition of the adjoining Process House.

Subsequently, re-excavation of the adjoining Process House area in the spring and early summer of 2000, revealed some pockets of material containing yellow phosphorus in the mud at depth in Grids E10, F10 and E11. This material was removed, resulting in an excavation down to 4.5m AOD. The re-excavation works also included a 5m or so wide strip of Zone 5 adjoining the Process House, see Figure 2.

3.3 Filling

After the pile stubs had been surveyed as an aid to future design, the area between the old existing mudslope, Process House and the remaining wharf was filled. Imported natural soils and ashes from the old power station site were used. Material was initially placed by end tipping at the north and south ends to displace the soft superficial mud and to form a platform from which more material could be pushed out. Once a relatively firm base had been established, the material was spread in layers and compacted by the tracks of the 20 tonne excavator and other earthmoving plant.

This filling was additional to that specified in the SDW and so is not covered by Albright & Wilson's method statements.

The fill was brought up to about 7 to 7.5m AOD and was only partially capped by granular crushed demolition materials.

Following completion of the Process House re-excavation works, the area was refilled with clean materials in July 2000 and the bank regraded in August leaving a clay surface at about 7.5m AOD.

4.0 VERIFICATION

4.1 General

The decontamination objectives in Zone 5, see Section 2.1, were met, as recorded in Albright & Wilson's daily log sheets and log book and the EC's observations on site. These have been collated to give a history of the work for each grid on a Grid Decontamination Sheet.

The results of tests on samples of sediment and water are included as Appendix C.

4.2 Proving

Prior to demolition, a number of mud samples were recovered at roughly 20m centres from the dock bed beneath the structure by long scoops, tested and demonstrated to be free of phosphorus. The results are enclosed as Appendix C.

Further samples were taken at closer centres following demolition, particularly beneath the former transfer/storage tanks and these results are also enclosed as Appendix C and are referenced on the GDS (Appendix D).

No phosphorus or other process wastes were identified during these initial works.

After the completion of the Process House re-excavation works, the excavated surface was sampled on a 5m grid and proved to be clear of phosphorus. Extracts from the laboratory book detailing the tests are included in Appendix G and are referenced on the GDS (Appendix D). A total of 98 samples were recovered and subjected to the on-site phosphorus test. No samples failed the phosphorus test.

The remaining structure consists of a suspended reinforced concrete deck, partly precast, supported by precast concrete piles set with rails for dockside cranes. The structure has been examined in detail with respect to its current condition. No process waste, raw materials or phosphorus was noticed during this and other ad hoc inspections. The surface of the structure is exposed so that significant quantities of such materials would be easily identified.

4.3 Trial Pits

As the decontamination works neared completion, a number of trial pits were dug around the site to confirm, or otherwise, that the works had been satisfactorily carried out and to permit recovery of samples for chemical analysis.

Trial Pits 37, 37A-F, 38, 39, 58, 59, 109, 421, 601, 602, 603 and 604 were dug within Zone 5 and detailed records of some of the pits and associated relevant laboratory testing are enclosed as Appendix F and their locations are shown on Figure 2. Note that the ground exposed in TP37, 37A-F, 109 and 603 was subsequently removed and the records are not included.

4.4 Remedial Works

At the northern end of the Zone, nominally 'clean' overburden from the hydrocarbon remediation works in the adjoining Zone 2 was spread over the surface in a layer about 1.2m thick. Trial Pit 37 etc of the verification series and associated testing demonstrated that the overburden material was not 'clean' and contained unacceptable levels of polyaromatic hydrocarbons. The Contractor, Churngold Remediation Limited, was then asked to remove the contaminated material. This work was done between March and October 2000 and their confirmatory tests are included in Appendix G.

During the course of remedial works in the area of the former Process House, a strip about 5m wide, of the adjoining Zone 5 was re-excavated to the in situ alluvium level as well as an 'embayment' into grids E10 and E11. A few small pockets of phosphorus contaminated material were found below the original mud surface and were dug out. The excavated surface was sampled on a 5m grid for phosphorus, proved to be 'clean' and was backfilled. Extracts from Albright & Wilson's laboratory book recording relevant samples and tests are included in Appendix G along with their method statement for the Process House Works and their completion report.