SITE CONDITION REPORT TEMPLATE

For full details, see H5 *SCR guide for applicants* v2.0 4 August 2008

COMPLETE SECTIONS 1-3 AND SUBMIT WITH APPLICATION

DURING THE LIFE OF THE PERMIT: MAINTAIN SECTIONS 4-7

AT SURRENDER: ADD NEW DOC REFERENCE IN 1.0; COMPLETE SECTIONS 8-10; & SUBMIT WITH YOUR SURRENDER APPLICATION.

1.0 SITE DETAILS	
Name of the applicant	Clariant Production UK Limited
Activity address	Llantwit Fardre nr Pontypridd CF38 2SN
National grid reference	ST 30800 185400

Document reference and dates for Site Condition Report at permit application and surrender	**Permit application**: The site was previously permitted under the PPC regime. A Phase 1 report was written as part of the Clariant acquisition of the site from NIPA Laboratories in 2001 and was used to support the PPC permit applications in 2002 and 2004: *Phase I Contaminant Source Audit and Preliminary Phase II Soil and Groundwater Investigation at Nipa Laboratories Ltd, Llantwit Fardre, URS Dames & Moore, 49467-001/DR122-CDF, September 2001*. **Permit Surrender**: This Site Condition Report, July 2017, Ref CRRP0011

Document references for site plans (including location and boundaries)	**Site Location:** · Figure 1 'Site Location Plan' *Extract from: Clariant Llantwit Fardre. Remediation Design Strategy Report. URS Infrastructure & Environment UK Limited, 46353018/CRRP0006, December 2014.* **Post-Closure, pre remediation source areas and potential pathways, including drainage:** · Figure 1 'Delineation Locations & Suspected Source Areas & Pathways' · Figure 6a 'P1 and P5 Soil Remediation Areas and Locations' · Figure 6b 'P3 and ETP Soil Remediation Areas and Locations' *Extracts from: Clariant Llantwit Fardre. Source Delineation & Remedial Options Appraisal. URS Infrastructure & Environment UK Limited, 46353018/CRRP0005, September 2013* **Remediation Monitoring Points** · Figure 1 'Site Features Plan' **Remediated Drainage** · Figure 3 'Drainage Excavation and sample plan' **Final Levels** · Appendix G, D1634_18 'Finish Levels Survey' *Extracts from: Clariant Llantwit Fardre. Site Remediation Verification Report. AECOM Infrastructure & Environment UK Limited,*

	46353018/CRRP0010, March 2017. **Site Surfacing** · Figure 8 Appended with this report showing operational surfaces and post remediation surfaces.

Note:
In Part A of the application form you must give us details of the site's location and provide us with a site plan. We need a detailed site plan (or plans) showing:

- Site location, the area covered by the site condition report, and the location and nature of the activities and/or waste facilities on the site.
- Locations of receptors, sources of emissions/releases, and monitoring points.
- Site drainage.
- Site surfacing.

If this information is not shown on the site plan required by Part A of the application form then you should submit the additional plan or plans with this site condition report.

2.0 Condition of the land at permit issue	
Environmental setting including: · geology · hydrogeology · surface waters	The environmental setting of the site is presented in the previously submitted Desk Study reports: *Clariant Llantwit Fardre, Phase 1 Desk Study Report, URS Infrastructure & Environment UK Limited, 46353018/ CRRP0001, May 2012* This report updated an existing Phase 1 report* with information relating to Clariant activities on the site since acquisition from NIPA Laboratories in 2001 and historical data that had come to light since the original Phase 1 was compiled. * *Phase I Contaminant Source Audit and Preliminary Phase II Soil and Groundwater Investigation at Nipa Laboratories Ltd, Llantwit Fardre, URS Dames & Moore, 49467-001/DR122-CDF, September 2001.*
Pollution history including: · pollution incidents that may have affected land · historical land-uses and associated contaminants · any visual/olfactory evidence of existing contamination · evidence of damage to pollution prevention measures	The pollution history of the site is presented in the Phase 1 Desk Study reports 49467-001/DR122-CDF (2001 – Clariant acquisition from NIPA / pre-Permit operations) and 46353018/CRRP0001 (2012 – closure of operations covered by the EPR Permits).
Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)	Evidence of historic contamination of the site is presented in the Phase 1 Desk Study reports 49467-001/DR122-CDF (2001 – Clariant acquisition from NIPA / pre-Permit operations) and 46353018/CRRP0001 (July

	2012 – closure of operations covered by the EPR Permits). A programme of MNA monitoring of pre-permit historic groundwater contamination was agreed with EA / EAW / NRW and undertaken between 2004 and 2011. Data for each MNA round was submitted to EA / EAW / NRW and is summarised in a data summary, presented as Appendix H of the Phase 1 report 46353018/CRRP0001. Post-closure site Investigation was undertaken in 2012 to establish the site condition in the former production areas. This was factually reported in 46353018/CRRP0002 (July 2012). A separate interpretive report, including a refined Conceptual Site Model (CSM) was issued as 46353018/CRRP0003 (October 2012). Development of the remedial requirements and remedial strategy were reported in the Source Delineation and Remedial Options Appraisal, 46353018/CRRP0005 (December 2014). Subsequent remediation was undertaken and presented as the Site Remediation Verification Report, 46353018/CRRP0010 (March 2017).
Baseline soil and groundwater reference data	Post-acquisition / Pre-permit site investigation in 2001 (49467-001/ DR122-CDF) identified existing contamination within groundwater surrounding the production units, but provided no baseline soil data from within the footprint of the operational production areas. Soil data that was collected in 2001 was from locations around the perimeter of the production areas. This data has not been used as baseline data as it is not considered to be representative of the 2001 condition of shallow soils beneath the production areas). Following the 2012 Phase 1 Desk Study (46353018/CRRP0001), a Site Investigation was conducted to collect post-closure soil and groundwater data from the former production areas, and factually reported in 46353018/CRRP0002 (July 2012). An interpretive report including revision of the Conceptual Site Model (CSM) was later issued as 46353018/CRRP0003 (October 2012). The referenced desk study and site investigation reports all support a CSM based on the presence of pre-Permit contamination located beneath the floor slabs of the

		production areas and along the alignment of the site effluent drainage systems. Failure of the original P1 area below floor effluent drainage system is identified as the most likely cause of contaminant release to ground. The original system was replaced with a stainless steel underfloor drainage system in circa 1995. The principal contaminants of concern include chlorinated hydrocarbons, which have not been used as part of the production activities undertaken during the PPC / EPR Permit operations.
Supporting information	· Source information identifying environmental setting and pollution incidents · Historical Ordnance Survey plans · Site reconnaissance · Historical investigation / assessment / remediation / verification reports · Baseline soil and groundwater reference data	

3.0 Permitted activities	
Permitted activities	Two Environmental Permits are associated with the site: BL7396IZ "Polymers", 2002, (most recent variation determined on the 14/07/06 – ref CP3630LT) and BV4339IX "Parabens", 2004 (most recent variation determined on the 01/09/06 – ref JP3936LT) Both permits are understood to have been subject to variation in 2006 to include additional process areas P8 and P9
Non-permitted activities undertaken	Non-permitted activities undertaken at the site were documented in the Phase 1 Desk Study Report, 46353018/ CRRP0001, May 2012
Document references for: · plan showing activity layout; and · environmental risk assessment.	Activities undertaken at the site were documented in the Phase 1 Desk Study Report, 46353018/ CRRP0001, May 2012 and are illustrated in the figures appended to that report. A Preliminary Risk Assessment (PRA) including CSM was presented as part of report 46353018/CRRP0001, identifying the potential for source, pathway, receptor pollutant linkages (PLs) to be present from activities completed at the site in line with the requirements of CLR11. The Risk Assessment and CSM were updated following further intrusive works and analysis (post site closure) in *Clariant Llantwit Fardre. Source Delineation & Remedial Options Appraisal. URS Infrastructure & Environment UK Limited, 46353018/CRRP0005, September 2013.*

Note:

In Part B of the application form you must tell us about the activities that you will undertake at the site. You must also give us an environmental risk assessment. This risk assessment must be based on our guidance (*Environmental Risk Assessment - EPR H1*) or use an equivalent approach.

It is essential that you identify in your environmental risk assessment all the substances used and produced that could pollute the soil or groundwater if there were an accident, or if measures to protect land fail.

These include substances that would be classified as 'dangerous' under the Control of Major Accident Hazards (COMAH) regulations and also raw materials, fuels, intermediates, products, wastes and effluents.

If your submitted environmental risk assessment does not adequately address the risks to soil and groundwater we may need to request further information from you or even refuse your permit application.

4.0 Changes to the activity	
Have there been any changes to the activity boundary?	No change – boundary consistent with permit/variation conditions.
Have there been any changes to the permitted activities?	Both permits are understood to have been subject to variation in 2006 to include additional process areas P8 and P9. The variation to permit BL7396IZ issued in 2006 was to include expansion of the operational area into the P8 building with increased production of a polymer already produced on the site. Permit BV4339IX was varied in 2006 as a new range of biocides were to be produced in building P9. Permitted activities remained the same until cessation of site activities in December 2011 (P3 and 95% of P1 Activities). The site ceased all activity in 2012 with staged site decommissioning undertaken in the latter half of 2012.
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	Details of the substances previously used on site are presented in Table 7 of Phase 1 Desk Study Report, 46353018/ CRRP0001, May 2012
Checklist of supporting information	· Plan showing any changes to the boundary (where relevant) · Description of the changes to the permitted activities (where relevant) · List of 'dangerous substances' used/produced by the permitted activities that were not identified in the Application Site Condition Report (where relevant)

5.0 Measures taken to protect land	
Section 5 of Phase 1 Desk Study Report, 46353018/ CRRP0001, May 2012 presents the former site infrastructure (prior to decommissioning) and includes; Storage of materials, summary of chemicals used on site; water and wastewater management; waste management and air emissions. Subsequent Clariant Records of measures taken to protect land at the decommissioning stage are referenced in Section 8.	
Checklist of supporting information	· Inspection records and summary of findings of inspections for all pollution prevention measures · Records of maintenance, repair and replacement of pollution prevention measures

6.0 Pollution incidents that may have had an impact on land, and their remediation	
The contaminant history of the site is presented in the Phase 1 Desk Study reports 49467-001/DR122-CDF (2001) and 46353018/CRRP0001 (2012). Further evidence of the pollution history of the site was presented following intrusive works and analysis (post site closure) in the Site Investigation and source delineation report 46353018/CRRP0005 (September 2013). The remediation undertaken at the site is presented in Section 9 of this SCR.	
Checklist of supporting information	· Records of pollution incidents that may have impacted on land · Records of their investigation and remediation

7.0 Soil gas and water quality monitoring (where undertaken)

The earliest available monitoring data for the site was collected in 2001 when investigation works were completed prior to acquisition of the site by Clariant. A series of groundwater monitoring wells were installed with soil samples collected for analysis during the drilling works. This series of wells is termed the 100 series and all well names begin with 1 (e.g. BH101).

Further investigation works were completed at the site since 2001, with additional monitoring wells installed during several phases of drilling undertaken to support the MNA programme. Wells drilled in 2004 are termed the 200 series (e.g. BH201) and wells drilled in 2006 are termed the 300 series (e.g. BH301). A single well was drilled in 2010 to replace one of the original wells that had been destroyed, this well was termed BH409 (replacement of BH109). Due to developments at the site, a number of the original wells were destroyed without replacement.

URS (now AECOM) completed annual groundwater monitoring at the site on behalf of Clariant. This monitoring was undertaken between 2004 – 2011, to deliver the MNA programme agreed with EA / EAW / NRW. Surface waters on the eastern boundary of the site have been monitored on an annual basis since 2005. Soil sampling and analysis was limited to samples collected during drilling (well installation) works.

The contaminants of concern identified from monitoring completed at the site included Volatile Organic Compounds and phenols. A Data Package Report was produced by URS for Clariant (CRLT0001, July 2011). This report summarised the findings of site investigation works at the site between 2001 and 2011. In addition, a groundwater monitoring report was produced in 2011 which presented summary tables of the historic groundwater monitoring data and the 2011 monitoring data. This report was presented in Appendix H of the revised Desk Study 46353018/CRRP0001 (2012).

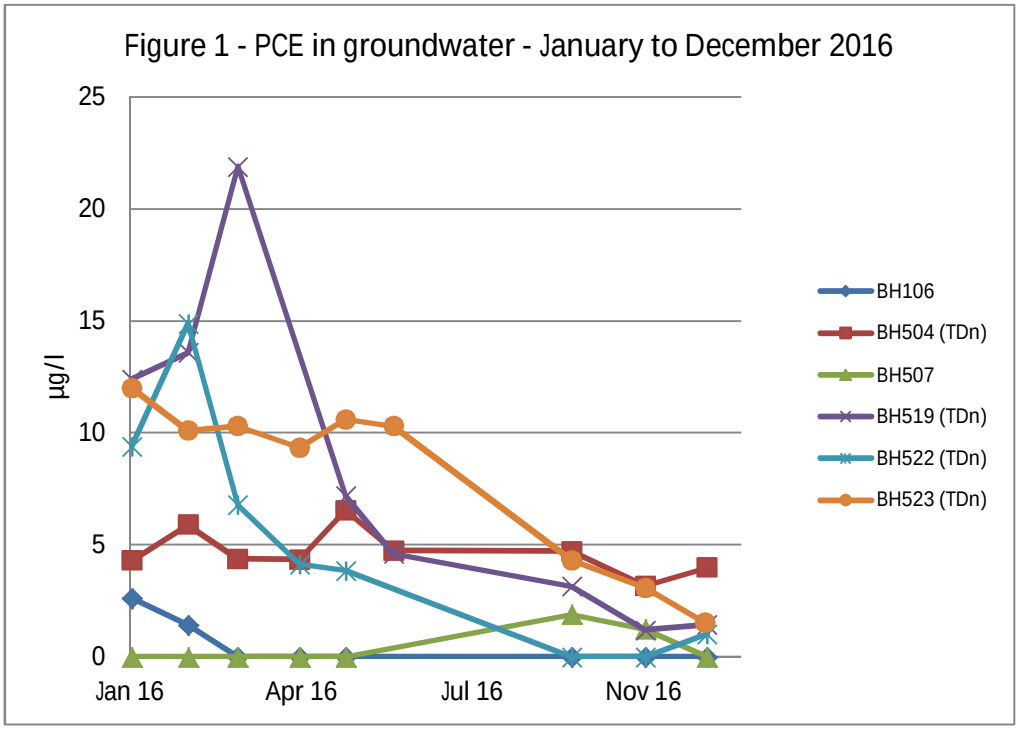
Four rounds of groundwater monitoring were undertaken as part of the post-closure site investigation. Groundwater samples were collected in March 2012, April 2012 (reported in CRRP0002), September 2012 (Round 3 Report, CRRP0004) and May 2013 (reported in CRRP0005).

Potential source areas identified by the 2012 post-closure site investigation were subject to further detailed investigation in 2013, to aid the detailed delineation of source areas and to inform the proposed Permit surrender remediation works. The results of the soil delineation borehole sampling and the remedial options were presented in the Delineation Report (CRRP0005, October 2013).

A pre-remediation groundwater and surface water baseline monitoring was conducted in July 2015 and the results presented as part of the Verification Report. In addition remediation monitoring activities (September to December 2015) and post remediation monitoring rounds (January to December 2016) were undertaken. The post excavation rounds were undertaken as part of the remediation strategy to assess contaminant concentration trends following the removal of the main source areas and were assessed in a Trend Analysis (Appendix I, CRRP0010, March 2017).

The monitoring so far suggests that concentrations of the primary contaminants PCE, TCE and breakdown product cis-1,2 DCE have been broadly decreasing since completion of the permit surrender remediation works, whilst concentrations of secondary breakdown products vinyl chloride and the breakdown chain ethene/ethane are increasing at some groundwater well locations, providing strong evidence that Natural Attenuation (NA) processes are providing additional polishing to residual dissolved phase contamination that is trapped within the isolated pockets of groundwater that are encountered within sandy / gravelly pockets of the glacial till / boulder clay.

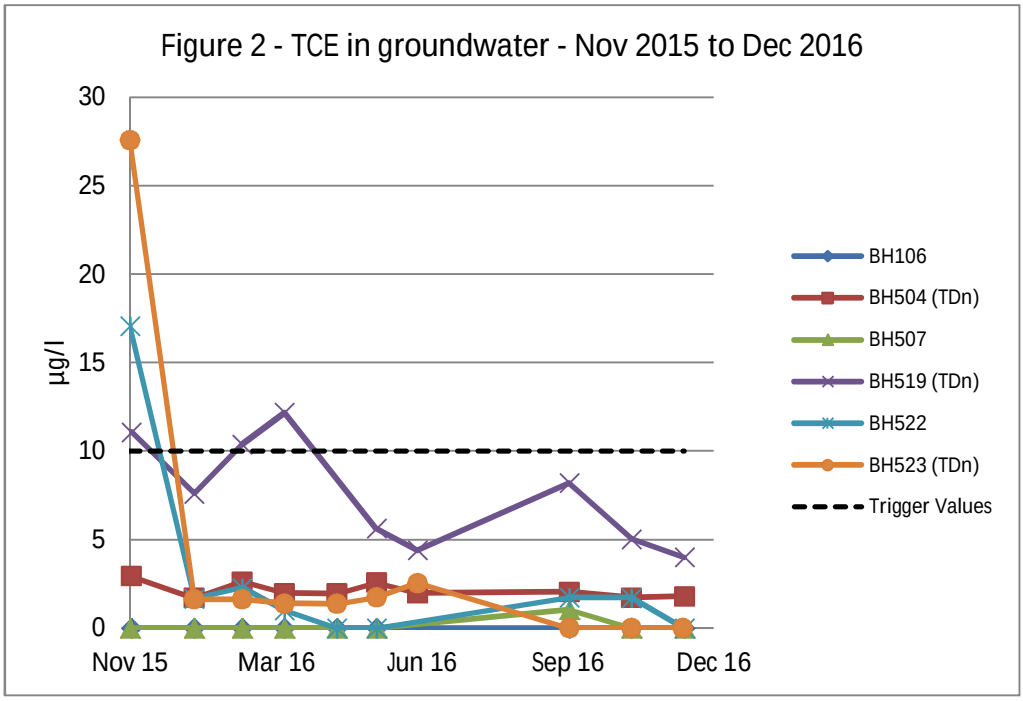
Figure 1 below illustrates the decreasing concentration of PCE within groundwater wells for the period January to December 2016. The Remedial Target Value (RTV) for PCE is 10µg/l.



TDn – Trend Down

Comparison of the post-remediation groundwater data to the Permit baseline condition is not valid as the earliest installed monitoring wells were peripheral to the main source areas (i.e. they were installed where operational constraints allowed) and the wells are no longer in existence to allow comparable sampling. Pre-Permit data from 2001 reports that PCE was detected at selected locations, in the range 2 -11µg/l. Data from the 2004-2011 MNA programme report PCE concentrations in the range <LoD - 443µg/l.

TCE concentrations within on-site wells in December 2016 are below the RTV of 10µg/l at a maximum concentration of 4.02µg/l in the sample from BH519. TCE has not been reported in any surface water samples since March 2016. Statistical downward trends are identified for SS05 and SS06, suggesting that up-gradient NA is taking place. Figure 2, below illustrates the decreasing TCE trends in groundwater.



Comparison of the post-remediation groundwater data to the Permit baseline condition is not valid as the earliest installed monitoring wells were peripheral to the main source areas (i.e. they were installed where operational constraints allowed) and the wells are no longer in existence to allow comparable sampling. Pre-Permit data from 2001 reports that TCE was detected at selected locations, in the range 1 - 47µg/l. Data from the 2005-2011 MNA programme report TCE concentrations in the range <LoD - 295µg/l.

Checklist of supporting information	· Description of soil gas and/or water monitoring undertaken · Monitoring results (including graphs)

8.0 Decommissioning and removal of pollution risk	
The decommissioning of the site is reported in a series of documents held by Clariant as summarised in the table overleaf. The general structure of each report includes the following information: · Summary Report · Project Scope · Chemical Information · Decontamination procedures and associated risk assessments · Plant P&ID's · Line lists · Decontamination certs an QA results · Waste records · Waste transfer notes In addition, refer to the specific post decommissioning remediation Section 9 below.	
Checklist of supporting information	· Site closure plan · List of potential sources of pollution risk · Investigation and remediation reports (where relevant)

Clariant Decommissioning Document List			
Project No.	**Project**	**Plant**	**Document Reference**
Decommissioning 001	P9 tank Farm	P9	D001/PROCESS/012/Decontamination Report Summary
Decommissioning 002	Hostamer 5487 & DPAS 160	P9	D002/PROCESS/012/Decontamination Report Summary
Decommissioning 003	Industrial Biocides Production	P9	D003/PROCESS/012/Decontamination Report Summary
Decommissioning 004	P3 Methyl Paraben	P3	D004/PROCESS/012/Decontamination Report Summary
Decommissioning 005	P3 Propyl/Ethyl Paraben	P3	D005/PROCESS/012/Decontamination Report Summary
Decommissioning 006	P3 B & C Other Production	P3	D006/PROCESS/012/Decontamination Report Summary
Decommissioning 007	Solvent Recovery Plants	Recovery	D007/PROCESS/012/Decontamination Report Summary
Decommissioning 008	P1A Building	P1A	D008/PROCESS/012/Decontamination Report Summary
Decommissioning 009	P1B Building	P1B	D009/PROCESS/012/Decontamination Report Summary
Decommissioning 010	P2 Building	P2	D010/PROCESS/012/Decontamination Report Summary
Decommissioning 011	P6 Polymer Production	P6	D011/PROCESS/012/Decontamination Report Summary
Decommissioning 012	P8 Polymer Production	P8	D012/PROCESS/012/Decontamination Report Summary
Decommissioning 013	P5 Liquids	P5	D013/PROCESS/012/Decontamination Report Summary
Decommissioning 014	Utility Supplies	Various	D014/PROCESS/012/Decontamination Report Summary
Decommissioning 015	Boiler House	Boiler House	D015/PROCESS/012/Decontamination Report Summary
Decommissioning 016	Effluent System	Pilot Plant	D016/PROCESS/012/Decontamination Report Summary For Pilot Plant Drains
Decommissioning 017	Warehouse 1 & 2	Warehouse	D017/PROCESS/012/Decontamination Report Summary
Decommissioning 018	Pilot Plant	Pilot Plant	D018/PROCESS/012/Decontamination Report Summary
Decommissioning 019	Liquids Tank Farm	Liquids	D019/PROCESS/012/Decontamination Report Summary

9.0 Reference data and remediation (where relevant)

Refer to Previous Sections 3 to 8 for historical data report references.

The Llantwit Fardre site was already operational at the time that Clariant acquired the site in 2001 and applied for the first of two Environmental Permits (Pollution Prevention and Control Permits, PPC, at the time of issue). Site investigation in 2001 (CRRP0001) identified existing contamination within groundwater surrounding the production units, but provided no baseline soil data from within the footprint of the production areas (soil data that was collected was from locations around the perimeter of the production areas). A programme of monitored natural attenuation (MNA) was agreed with the Environment Agency (EA) / Environment Agency Wales (EAW) at the time of Permit issue and was maintained up until the site closure process commenced in 2010/11.

Given that the "Permit baseline" site condition already included the presence of groundwater contaminants (including chlorinated hydrocarbons not subsequently used during the Permit operations period), Clariant followed an approach of open engagement with NRW (formerly Environment Agency Wales) to establish the condition of the site and to agree an appropriate approach for remediation and permit surrender. This approach was based on the removal of the grossly contaminated soil source zones that were located beneath the floor slabs of the former production areas and were contributing to the observed groundwater contamination.

AECOM site investigation work (2011-2013) identified that the source zones include a mixture of contaminants, with the most significant risks being associated with chlorinated hydrocarbons which were exclusively used before the Permits were issued and have not been used as part of the processes covered by the Environmental Permits held by Clariant. The identified phenol, hydrocarbon (toluene) and alcohol contamination within the source areas could potentially be attributed to both pre-Permit and post-Permit operations.

The agreed objectives of the Permit Surrender Remediation were:

Site remediation to a standard that allows Clariant to apply for Environmental Permitting Regulations (EPR) Permit surrender, within a timescale appropriate to Clariant's business needs (anticipated as a 12 week remediation program followed by 6 to 12 months of groundwater and surface water monitoring, depending on results of that monitoring).

Reduction of the main contaminant source term within the former production areas. Removal of the gross contamination within the principal sources to reduce the contaminant mass available for migration to identified human health and controlled waters receptors. Contaminated soils disposed of off-site to an appropriately licensed facility and under full waste Duty of Care procedures.

Compliance with agreed Controlled Waters compliance criteria at agreed compliance points.

Reduction of contaminant migration pathway effectiveness.

The package of remediation works agreed with NRW included:

- Excavation of gross soil contamination from the four identified source areas beneath P1, P5/P6, P3 and ETP.
- Screening of excavated soils to allow segregation and stockpiling for re-use on site, or offsite treatment / disposal as non-hazardous or hazardous waste, as applicable.
- Backfilling and re-profiling of the remediation areas, with reused site derived soils and / or imported clean backfill.
- Ongoing environmental monitoring, as detailed within the Environmental Monitoring Plan, and including NA monitoring to assess condition of shallow groundwater following removal of the gross source zone contamination.
- Completion of verification activities as specified in the Verification Plan.

Each of these activities has been completed and are documented in the 2016 Verification Report.

Based on a meeting held with NRW (Clariant / NRW / AECOM, 18th April 2017), it is considered that the Verification Report demonstrates that the objectives of the agreed Permit Surrender remediation works have been met and that the agreed scope of remediation has been completed such that the site is now in a satisfactory state and considered to be suitable for Permit Surrender.

Checklist of supporting information	· Land and/or groundwater **data collected at application** (if collected) · Land and/or groundwater **data collected at surrender** (where needed) · Assessment of satisfactory state · Remediation and verification reports (where undertaken)

10.0 Statement of site condition

Refer to remediation Verification Report, CRRP0010, February 2017. The concluding summary of the Verification Report identifies the work undertaken to improve the condition of the site compared to the original pre-Permit operational condition and operational Permit phase condition. The current site condition is as described in the Verification Report and summarised below.

> *"In total 4,254m^3 of soils inclusive of shallow drainage runs and overlying concrete floorslabs and hardstanding were excavated on site, of which approximately 900m^3 comprised site derived concrete (volume after crushing).*
>
> *Of the total 4,254m^3 excavation volume approximately 2,363m^3 of contaminated material was disposed of off-site of which 836m^3 was consigned as hazardous waste. The remaining 1,527m^3 was disposed of off-site as non-hazardous waste.*
>
> *In addition, approximately 20m^3 of asbestos contaminated concrete and shallow made ground encountered in P3 were disposed of off-site.*
>
> *The disposed material represents the removal of the gross soil contamination from the four identified source areas plus connecting drainage runs and former effluent treatment sump. It is concluded that these excavations have considerably reduced the contaminant source term and also reduced the viability of the contaminant migration pathways found during the remedial works. In particular, the 836m^3 of hazardous waste contained free product primary contaminants that would have provided an ongoing soil source if left in-situ.*
>
> *Of the excavated soils stockpiled on site, approximately 1,212m^3 was confirmed as suitable for re-use based on segregation, laboratory validation sampling and passing screening against the site specific Remedial Target Values (RTVs), completing verification as specified in the Verification Plan. These materials were either uncontaminated (soils from above or adjacent to contaminated source areas) or mildly contaminated (i.e. did not represent "gross source contamination").*
>
> *In addition, approximately 601m^3 of site derived demolition rubble; some of which was known to contain trace asbestos, was determined suitable for backfill within two deeper sections the P1 excavation (576m^3) and one area of the P3 excavation (25m^3).*
>
> *During the course of the excavation works an additional scope was agreed to include removal of all remaining concrete hardstanding over the P5, P3 and ETP areas. Subsequent trial pits for visual and olfactory assessment, plus verification sampling undertaken in P3 and P5 confirmed that shallow fill material surrounding the remedial cells was suitable for grading-in during the backfill process.*
>
> *As part of the re-profiling of the remedial areas the retaining wall to the north of P1 and P5 was removed, plus lower brick walls along the remainder of the northern P1 boundary and along the length of the southern P1 and P5 boundary. This enabled the slopes between the terraced levels of these areas to be safely re-profiled.*
>
> *Throughout the course of the works environmental monitoring was undertaken as specified in the Environmental Monitoring Plan for the management of noise, dust, odour and vapour.*

In line with the Verification Plan, ongoing monitoring of groundwater and & surface water has been undertaken throughout the works and for a period of beyond six months post remediation. At this time the potential surface water receptors downgradient of the site are in compliance with the agreed Remedial Target Value criteria for controlled waters.

A Trend Analysis of the current data demonstrates reducing trends in the primary contaminants within groundwater wells on site and a correlating increase in breakdown products in the reductive de-chlorination chain. The data provides strong evidence for ongoing Natural Attenuation of the residual contamination that was already entrained within migration pathways.

It is considered that this report demonstrates that the objectives of the project have been met and that the agreed scope of remediation has been completed such that the site is now considered to be suitable for Permit Surrender upon the production of a Site Condition Report."