

SCR evaluation

Name of activity, address and NGR	<p>GlaxoSmithKline (GSK) Harlow Incinerator. GSK Research and Development Limited, New Frontiers Science Park, Harlow, Essex, CM19 5AW.</p> <p>The National Grid Reference of the centre of the North Site of the New Frontiers Science Park is TL 429 095.</p> <p>Environmental Permit Surrender Reference is EPR/KP3430BL/S003.</p>
Document reference, date and version of application SCR	<p>Application Site Report for PPC Application – ‘GlaxoSmithKline Research and Development Ltd, New Frontiers Science Park, Harlow, Essex. AEA Technology, KP3430BL’ (November 2004).</p>

1.0 Site details	
Has the applicant provided the following information as required by the application SCR template?	
<p>Site plans showing site layout, drainage, surfacing, receptors, sources of emissions/releases and monitoring points.</p>	
<p>The Operator provided a Site Condition Report (SCR) at the time the original application was made. Drawings were provided by the Operator and reviewed and accepted by the Environment Agency at the application stage.</p>	

2.0 Condition of the land at permit issue	
Has the applicant provided the following information as required by the application SCR template?	
<p>a) Environmental setting including geology, hydrogeology and surface waters.</p> <p>b) Pollution history including:</p> <ul style="list-style-type: none"> • pollution incidents that may have affected land • historical land-uses and associated contaminants • visual/olfactory evidence of existing contamination • evidence of damage to existing pollution prevention measures. <p>c) Evidence of historic contamination (i.e. historical site investigation, assessment, remediation and verification reports (where available)).</p> <p>d) Has the applicant chosen to collect baseline reference data?</p>	
<p>a) - A Conceptual Site Model was provided in the SCR. The installation is located within the Energy Management Centre in Building H39 at the New Frontiers Science Park in Harlow, Essex. The Science Park is subdivided into three campuses known as the North, Middle and South Sites - the installation is located on the northern boundary of the North Site on the edge of the Pinnacles Estate. The North Site has a number of facilities including a variety of chemical, biological and radiological laboratories, effluent holding plant, bulk solvent and chemical storage, offices and administration businesses.</p> <p>The land falls away to the south and east in the direction of the River Stort and Canons Brook valleys. The land to the north and west of the Pinnacles Estate is predominantly agricultural and scattered housing with Roydon village located 1km to the north-west. Approximately 500m east and south are the suburbs of Harlow, Little Parndon, Great Parndon and Hare Street.</p> <p>A wide range of laboratory chemicals and solvents were used on site for over 30 years. The site remained greenfield through to 1947 except for a small gravel pit later infilled. Part of the North Site was owned by GSK and its predecessors since 1969 when 2.5 acres and a pilot plant were acquired from Berk Chemicals Limited. A further 7 acres of greenfield land were added in 1973, 4 acres of former warehousing in 1989 and 3 acres of a former gas bottle components assembly factory (BOC).</p> <p>Demolition of the BOC site included removal of structural asbestos, and decommissioning of a metal treatment facility and a cyanide effluent sump. Intrusive investigations of the former BOC site undertaken at the site in 1999 and 2000 suggested significant contamination was not present in the areas investigated.</p>	

2.0 Condition of the land at permit issue

Has the applicant provided the following information as required by the application SCR template?

The underlying geology of the site is likely to comprise:

Made Ground: of varying thickness across the site and is comprised of largely reworked natural materials with chalk, brick and concrete fragments. It is likely to be low in permeability due to the high clay content of the insitu geology.

Superficial Deposits: comprising Upper and Lower Glacial Till interbedded with two distinct Upper and Lower Glacial Sand and Gravel deposits. The Upper deposit comprises sand and gravel whereas the Lower deposit is primarily gravels. There is the possibility of lateral movement within the Lower Glacial Gravel Deposit allowing for the transport of contaminants onto and off of the site. Given the site topography, any such movement would be expected to be in an easterly/north-easterly direction. Shallow groundwater has been reported within the confined granular Superficial Deposits and within the Lower Glacial Gravel Deposit in particular (gravel thickness between 1m to 6m). The highly variable permeability of the Superficial Deposits means that the Environment Agency has classified them as a non-aquifer of low permeability.

London Clay Formation: comprising soft to stiff chocolate to red brown clay and clay silts. The formation is typically 25m to 30m in thickness in the vicinity of the site. The London Clay is a low permeability stratum and likely to restrict the downward migration of any contaminants from reaching the underlying sensitive aquifers. It has been classified by the Environment Agency as unproductive.

Woolwich and Reading Beds: comprising brown and green fine clayey sands with occasional pebbles and waxy mottled clays. The deposit has a typical thickness of 10m to 15m and has been classified as a minor aquifer capable of supporting locally important abstractions.

Upper, Middle and Lower Chalk: comprising a fine-grained fissured white/grey limestone. The formation is in the region of 200m thick. The chalk is classified as a major aquifer with a low vulnerability that supports large potable abstractions.

The River Stort is approximately 1km north and Canons Brook approximately 400m east of the site flowing in a northerly direction. Canons Brook is not monitored for water quality by the Environment Agency and is not classified under the General Quality Assessment scheme. It is possible that shallow sand and gravel deposits are in hydrological continuity with this brook.

According to the Environment Agency, there are no licensed surface water abstractions within a 2km radius of the site. Groundwater is abstracted for horticultural purposes from the Chalk 250m to the south-west of the site, and for drinking purposes approximately 1km to the north-west at Roydon Pumping Station. The direction of groundwater flow in the area is thought to be from the north-west to the south-east both these abstractions are therefore considered to be down gradient of the installation. The site is within a surface water safeguard zone and a nitrate vulnerable zone.

b) and c) – Potential exists for the following to be historical sources of contamination:

- effluent drainage system and associated settlement tanks on the east side of the North Site
- leaks from the pilot plant and waste solvent storage tanks
- chemical contamination as the result of a fire under Building H9
- former waste incinerator - Buildings H6 and H21
- fuel storage, waste storage, raw material storage and maintenance facilities
- historically infilled former gravel pit.

d) - No targeted intrusive investigations were undertaken to support the original permit application. However, the following investigation and assessment were undertaken on site previously and were reviewed as part of the application SCR:

- 'Phase 1 Environmental Review, SmithKline Beecham, Research and Development Site, New Frontiers Science Park (NFSP), Harlow, Essex'. Environmental Assessment Group Limited (Environ, 1999).
- 'Environmental Review, EPA Part IIA Assessment, Harlow'. Environmental Assessment Group Limited (Environ, 2000).

These were not accepted as baseline data for the permitted site area as they didn't target specific permit related contaminants and covered the whole of the north and south campus'. There was no physical or laboratory evidence of contamination within the soil and water samples that were taken from the site and

2.0 Condition of the land at permit issue	
Has the applicant provided the following information as required by the application SCR template?	
tested.	

3.0 Permitted activities	
Has the applicant provided the following information as required by the application SCR template?	Response (Specify what information is needed from the applicant, if any)
a) Permitted activities b) Non-permitted activities undertaken at the site	
<p>The Environment Agency determined that the Installation comprised Section 5.1A(1)(a) - incineration of hazardous waste as listed in Part 1 of Schedule 1 of the PPC (England and Wales) Regulations 2000 at the time of the original application determination. The incinerator had both a primary and secondary combustion chamber and was predominantly used for destroying laboratory-based pharmaceutical research and development wastes comprising a wide range of laboratory chemicals and solvents.</p> <p>Directly Associated Activities at the site included:</p> <ul style="list-style-type: none"> ➤ an incinerator feed facility ➤ solid waste storage bin wash facilities ➤ scrubber tower and bag filter ➤ storage facilities for lime and carbon (raw material as well as spent material). <p>Wastewaters and effluents from the bin washer, boiler blowdown, floor washings and rainwater runoff from the storage yard went to an offsite effluent treatment plant (not included within this permit).</p>	

3.0(a) Environmental Risk Assessment
The H1 environmental risk assessment should identify elements that could impact on land and waters, cross-referenced back to documents and plans provided as part of the wider permit application.
The Environment Agency reviewed the Operator's environmental risk assessment (H1) including the potential for environmental impact from emissions to air at the time of the original permit determination and accepted the H1 as satisfactory. An Improvement Programme was set within the original permit to ensure that the identified required improvements were undertaken over specified timescales at the installation.

3.0(b) Will the pollution prevention measures protect land and groundwater?
Are the activities likely to result in pollution of land?
<p>It was concluded that there was little likelihood of pollution arising from the installation's operation provided that it was operated and maintained correctly. There were no direct discharges of hazardous substances or non-hazardous pollutants to groundwater from the site. To ensure the continued effectiveness of pollution prevention measures to protect the land the Operator was required to implement and operate under a Site Protection and Monitoring Programme (SPMP) which was in place for the incinerator from November 2005. Continuous environmental monitoring (CEMS) reporting and annual monitoring reporting under permit condition 4.1 was required.</p> <p>The operator provided a SCR which was supported by the original SCR. The operator confirmed that the ASCR produced in November 2004 was also valid for the two new areas in the variation application (adding a yard storage area and a covered storage area – refer to plans at the end of this document) as it was based on assessments related to the whole site rather than just the installation boundary.</p> <p>Phase I and Phase II Surveys were conducted on site and considered previous uses and the wider site in the assessment of pollutant, pathways and receptors. Measures to mitigate the risk were addressed in the existing SPMP with a combination of primary, secondary and tertiary containment ensuring the prevention of pollution.</p> <p>The SCR supplied in response to a Schedule 5 Notice dated 29 October 2009 stated that the conclusion of "little likelihood" was maintained and that baseline data was not required. The environmental risk assessments were extended and considered to be sufficient. The SPMP was implemented during the life of the permit and reviewed on an annual basis. Pollution prevention measures were in place to prevent</p>

pollution to the land and groundwater. The SPMP and equivalent pollution prevention measures were extended to cover the additional areas and the SCR was maintained during the life of the installation.

It should be noted that 27 tonnes of this related to radioactive wastes. These wastes are not included within this surrender notice as they have been assessed and fully surrendered as part of a previous surrender application CA5508/S001 dated 06/08/2013 for the permits AD2891/CA5508 and BR7054/BW1521. The incinerator capacity remained the same at 420kg/hr.

For dangerous and/or hazardous substances only, are the pollution prevention measures for the relevant activities to a standard that is likely to prevent pollution of land?

The incinerator had its own Environmental Management System (EMS) which included operational procedures covering all aspects of the process and associated activities. GSK employed AEA Technology and then Indaver as the onsite specialist waste management contractor at the Harlow site who were responsible for both the operation of the incinerator as well as the site waste management provisions and procedures.

Application SCR decision summary	Tick relevant decision
Sufficient information has been supplied to describe the condition of the site at permit issue	Yes.
Pollution of land and water is unlikely	Yes.
Date and name of reviewer:	Liz Ebbs (NPS) – 10/02/2016.

Operational phase SCR evaluation template

4.0 Changes to the activities	
Have there been any changes to the following during the operation of the site?	Response (Specify what information is needed from the applicant, if any)
a) Activity boundaries b) Permitted activities c) "Hazardous pollutants" used or produced.	
<p>The permitted activity comprised Section 5.1A(1)(a) - incineration of hazardous waste within the surrender area and remained as detailed within Environmental Permit EPR/KP3430BL until the cessation of incineration at the site. Application EPR/KP3430BL/V002 varied the permit to allow the Harlow Incinerator to be able to take permitted wastes from other GSK owned sites for incineration. This required additional waste reception and storage areas, an increase in the incinerator operating hours and an increase in the annual throughput to 1,613 tonnes per annum.</p> <p>It should be noted that 27 tonnes of this related to radioactive wastes. These wastes are not included within this surrender notice as they have been assessed and fully surrendered as part of a previous surrender application CA5508/S001 dated 06/08/2013 for the permits AD2891/CA5508 and BR7054/BW1521. The incinerator capacity remained the same at 420kg/hr.</p>	

5.0 Measures taken to protect land
<p>Has the applicant provided evidence from records collated during the lifetime of the permit, to show that the pollution prevention measures have worked?</p>
<p>No notable pollution incidences occurred during the lifetime of the permit. Improvement conditions were set in the permit to improve the prevention of pollution and included installation of suitable monitoring equipment to be WID (waste incineration directive) compliant, including CEMS (continuous environmental monitoring system), schedule inspections to review the integrity of hardstanding at the site and establish the PM10 and NOx contributions from the installation.</p> <p>A programme of infrastructure monitoring was implemented comprising a checklist of inspections and testing devised in the SPMP. An SPMP audit was conducted internally by GSK and its contracted incinerator operator, Indaver, on an annual basis and a Performance Report produced at the end of each year. Corrective actions were identified and planned preventative maintenance was undertaken by GSK's Engineering Contractor. An Infrastructure Monitoring Plan was implemented to monitor the effectiveness of pollution prevention infrastructure and provide early warning of any release of polluting substances to ground or groundwater. All records were maintained on-site.</p> <p>Appropriate management systems and structures were in place with sufficient financial, technical and manpower resources to ensure compliance with the permit conditions. This included working instructions, waste management procedures and incident reporting. There was a system of accident prevention encompassed within the EMS to ensure that appropriate measures were in place to minimise accidents. Maintenance and inspection processes were in place to raise work instructions if repairs were needed.</p> <p><u>Lime Silo and associated pipework:</u> Pipework was checked during regular inspections. The interior integrity of the silo was visually inspected on a monthly basis when the lime level was checked. Secondary containment was provided by the concrete surfacing of the waste storage yard. There were no records of any major spills associated with the lime silo.</p> <p><u>Incinerator Hall:</u> Spill kits were situated at either end of the hall, procedures for their use were in place and the area was visited and inspected daily. Residual activated carbon and spent lime was automatically fed into a flexible intermediate bulk container (FIBC) and then removed and stored in an open skip in the waste storage yard. Primary combustion chamber bottom ash was collected in a sealed skip and also stored in the yard prior to removal. There was a vacuum system for dust removal and incinerator plant lime and ash residues did not discharge unless the system was sealed. The collected dusts were added to the spent lime/carbon FIBCs. The incinerator only received dry wastes and only dry vacuuming was permitted for cleaning the plant therefore no liquid effluent was discharged to the drains during the plant operation.</p>

Water Conditioning Chemicals:

Were contained within three separate containment vessels held within individual plastic bunds which stood on hardstanding. Any spillage was contained by the yard hardstanding.

Waste Reception Area:

Bins were visually inspected during unloading and any where containment was compromised were removed and replaced. Bin wash detergent was held in the plastic containers was delivered on a banded pallet. Minor spills of activated carbon powder were cleaned during general housekeeping.

Waste Storage Yard and associated areas:

Chilled containers were on hardstanding and regularly monitored and inspected. Wash waters from cleaning entered the process effluent drains situated in the centre of the yard. There were separated areas used for hazardous waste, gas cylinder, liquid gas and water treatment vessel storage prior to removal from site. Waste was not held for more than six months. There were four internal store rooms and each doorway had a concrete lip. Material was controlled and tracked by both a paper and electronic system.

Drainage System:

The yard was designed so that any spillages or liquids were directed to the site foul sewer. Liquids were then held in tanks at the effluent holding plant and monitored prior to discharge. Drains in all areas entered the process drainage system which led to the offsite effluent holding plant. All pipework was in good condition.

6.0 Pollution incidents that may have impacted on land and their remediation

Has the applicant provided evidence to show that any pollution incidents which have taken place during the life of the permit and which may have impacted on land or water have been investigated and remediated (where necessary)?

No recorded pollution incidents or significant spills, leaks or losses that would be considered to have given rise to a change in site condition exist for the life of the permit. Only small isolated or minor spills onto hardstanding were recorded and were cleaned up immediately. The presence of a substantial deposit of impermeable London Clay means that it is extremely unlikely for any significant downward movement of substances into the underlying aquifers.

7.0 Soil gas and water quality monitoring (where relevant)

Where soil gas and/or water quality monitoring has been undertaken, does this demonstrate that there has been no change in the condition of the land? Has any change that has occurred been investigated and remediated?

No soil and groundwater monitoring and/or testing was carried out for the original application although the application SCR makes reference to intrusive site investigation reports undertaken at the site pre the PPC permit application (refer to Section 2.0 d) of this SECRET). No additional intrusive soil and groundwater background data was collected for the application made in 2004.

Surrender SCR Evaluation Template

8.0 Decommissioning and removal of pollution risk

Has the applicant demonstrated that decommissioning works have been undertaken and that all pollution risks associated with the site have been removed? Has any contamination of land that has occurred during these activities been investigated and remediated?

Permitted activities at the GSK incinerator ceased in December 2010 with the majority of the decommissioning works being undertaken in 2010 and 2011. Plant decontamination, waste disposal, cleaning of plant (vacuuming) and services isolation was undertaken between 2013 and 2015. The following reports have been submitted by the Operator as part of the surrender application:

- 'Surrender Site Condition Report – GSK Harlow, Environ, Ref: UK11-20909' (December 2015).

Reference has also been made to the original SCR and a pre-application surrender site condition report:

- 'Application Site Report for PPC Application – GlaxoSmithKline Research and Development Ltd, New Frontiers Science Park, Harlow, Essex. AEA Technology, KP3430BL' (November 2004).
- 'Surrender Site Condition Report GSK Harlow'. Sodexo (03 October 2013).

Baseline data for soil, groundwater or land gas was not required by the original SPMP and there were no known significant spills, leaks or losses during the lifetime of the permit. The incinerator received only dry wastes, plant cleaning was undertaken by vacuuming and no wash water was generated. As such no site investigation data was collected or is considered to be required in relation to the permit surrender.

GSK originally wanted to transfer the incinerator permit during the sale of the site but the new owner does not require the incinerator. Therefore, GSK needed to fully decommission the site and surrender the permit. It is expected that the site will be in the control/ownership of the new owner in 2018.

Lime Silo, Activated Carbon and associated pipework:

Lime silo emptied and any unused lime was sent for disposal (waste transfer notes and photos available). Carbon hoppers were emptied and any unused carbon was returned to the suppliers for re-use. Lime and carbon removed from the facility February 2011. Storage areas and cages were cleared.

Water Conditioning and associated infrastructure:

Waste heat boiler was isolated and drained upon cessation of operations. Boiler tubes cleaned and any waste liquids removed from the facility.

Waste Reception Area, Storage Yard and associated areas:

Refrigerated stores were decontaminated, off-hired and removed from the facility. All wastes in the waste reception area were removed in December 2010 and external wastes stores outside the main incinerator building emptied. Use of bin wash stopped when incineration activities ceased and detergents removed from the facility. Wheelbins transferred to the GSK Stevenage site for washing then recycling.

Flue Gas Treatment Plant:

Filter socks removed and dust hopper emptied into 1 tonne FIBCs for removal off of site (waste transfer note available).

Incinerator Hall:

The incinerator plant has been decommissioned but the physical removal of the infrastructure will be the responsibility of the future site owner. Bottom ash from the primary and secondary chambers was removed in December 2010 with a second clean-up operation in December 2013. In January 2015 purpose made bottom ash skips were disposed of in their entirety, second cleaning of plant and removal of any remaining ash from plant (waste transfer notes available). The hydraulic oil lines between the ram and the hydraulic pump were cut, fully drained down of hydraulic oil and removed in 2015 (waste transfer note available).

A 6m section of pipework between the primary and secondary combustion chambers has the potential to contain some residue ash but which cannot be removed due to its location within the incinerator plant and inherent access constraints. This has been brought to the attention of the new owners. A final inspection of the incinerator plant was undertaken in July 2015 including a final housekeeping clean which generated four 60 litre containers of ash, lime and carbon.

Site Drainage:

A survey from 2015 has confirmed that the drainage system was of sound integrity with the exception of two sections of storm water drainage outside of the incinerator building. The drains have not been utilised since the decommissioning of the incinerator and SPMP reports show that there were no subsequent known issues with the drains. Incident and SPMP audit reports showed that no spillage or leaks into the drains had occurred since 2006 when reporting commenced. The potential for the drainage system to have led to pollution was considered to be low. A surface water gulley identified by the EA in December 2014 to contain some minor solid debris was cleaned as part of the survey. On this basis the potential for transmission of incinerator related pollutants via the drainage system and thereafter to ground via the drainage system is considered to be substantially eliminated.

Site Services:

The gas supply pipe to the incinerator has been cut and capped (May 2014) and the electric supply has had the fuses removed from the distribution supply board (April 2014). All electrical, gas and compressed air services were isolated such that the incinerator cannot be reinstated. The old oil tank was drained down and residual oil correctly drummed for offsite disposal.

The only remaining infrastructure that represents a potential risk, but which is not associated with the incinerator itself, is an active diesel line. This is within a concrete lined service tunnel running under the incinerator footprint and serves operational boilers outside of this installation boundary. The boilers operate under Environmental Permit EPR/FP3633LA and pipeline inspection will be maintained in line with the permit's SPMP.

9.0 Reference data and remediation (where relevant)

Has the applicant provided details of any surrender reference data that they have collected and any remediation that they have undertaken?

The Application Site Report for the PPC application for GlaxoSmithKline Research & Development Ltd, New Frontiers Science Park, Harlow, Essex ref: KP3430BL dated November 2004 produced by AEA Technology, did not include baseline data. No surrender soil and groundwater data has been collected.

10.0a and 10b Statement of site condition

Has the applicant provided a statement, backed up with evidence, confirming that the permitted activities have ceased, decommissioning works are complete and that pollution risk has been removed and that the land and waters at the site are in a satisfactory state?

During decommissioning all sources of potential pollution risk were removed. All wastes and raw materials associated with the regulated activity were removed from site as part of the surrender process. As of September 2015 all identified wastes have been removed under appropriate waste transfer notes, the incinerator decontaminated and the drainage network undergone a CCTV survey and inspection.

Whilst all services to the incinerator plant have been isolated and the plant decommissioned and cleaned, Public Health England (PHE) will be responsible for the dismantling of the incineration plant. There are potential residual contaminants remaining at the site which the future site owner PHE have been advised of. These are:

- 6m section of pipework between the primary and secondary combustion chambers has the potential to contain some residue ash
- an active diesel line that passes through a concrete lined service tunnel under the incinerator footprint and serves operational boilers outside of the installation boundary (and are not associated with the incinerator or permit itself).

The site does not require remediation and verification reports to be submitted as part of the full surrender of the permit EPR/KP3430BL. The site has a historic legacy, particularly in relation to the former BOC site which may have caused ground and/or groundwater contamination. Previous investigations have not identified significant contamination from historical land uses underlying the installation but the potential for there to be areas of undetected contamination and/or non-permit related contamination located beneath the site cannot be completely excluded.

The chemical nature of any potential historical contamination will be distinct from substances which might have resulted from the permitted site operations. It is therefore possible that further site investigation may be required depending on the type of any future site redevelopment proposals under the planning regime and any future changes in UK contaminated land legislation.

The DEFRA core guidance states that for an installation to have been returned to a satisfactory state the regulator must ensure that the necessary measures have been taken to return the site of the regulated facility to a satisfactory state. This can only be achieved if operators aim to restore a site to the condition it was in before the facility was put into operation. Other than in exceptional circumstances operators should remove any contamination and return the site to the original condition. However, where an operator can robustly demonstrate that is unsustainable or not practical to do this, then the contamination should be removed as far as practicable.

The return of the site of the regulated facility to a satisfactory state should include:

- the removal of any residual waste deposits
- removing as far as is practical any contamination to return the site to the original condition
- where removal is not practical - treating or immobilising contamination remedying any harm the contamination may have caused, and mitigating the effects of any harm.

The Permit Surrender Report prepared by Environ details that the infrastructure associated with the installation activities have been emptied and purged but not removed as it expected that the new site owner will carry out that work. However, no site investigation fully characterises a site. Not all of the site area was accessible during the investigations to date. It would appear that the applicant has treated or immobilised previous contamination remedying any harm the contamination may have caused, and mitigating the effects of any harm.

Although the site has not been reinstated back to its original condition before the facility was put into operation, based on the information provided, the soil and groundwater data would probably not warrant actions under Part 2A. However, should the conceptual site model change then remediation may be required at a future date. The Environment Agency confirms that they do not believe that there would be any ongoing risk to the receptors identified as the site.

The Environment Agency confirms that the permitted GSK Harlow Incinerator installation has been returned to a satisfactory state.

Surrender SCR decision summary	Tick relevant decision
Sufficient information has been supplied to show that pollution risk has been removed and that the site is in a satisfactory state – accept the application to surrender the permit.	✓
Date and name of reviewers: Liz Ebbs (NPS) – 17/03/2016 Theresa Cory (GWCL) - 26/04/2016	

