

RWE Generation UK

Seal Sands

Seal Sands Power Station Permit Surrender Site

Condition Report

Location: Seal Sands Power Station

Permit No: CP3939QN

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Summary

This site condition report has been prepared by RWE Generation UK (RWE) to accompany an application to the Environment Agency to surrender the environmental permit CP3939QN.

RWE believe that the information given this report and the associated appendices show beyond reasonable doubt that the ground and groundwater within the permit boundary has not deteriorated since the environmental permit was issued in 2006. Therefore RWE concludes that the site is in a satisfactory condition at the time of this submission and no further action is required to be undertaken to enable the surrender of the environmental permit.

Introduction

This document has been prepared to support an application by RWE Generation UK plc to surrender the permit for its Seal Sands Power Station following cessation of permitted activities and demolition of the associated plant.

The land is leased from Conoco Phillips (CoP) and RWE are required to vacant leased land by 30th September 2023.

1.0 Site Details

The RWE Generation UK Seal Sands Power Station site is located at North/ South Access Road, Seal Sands, Middlesbrough, TS2 1FB. The centre of the site is at National Grid Reference NZ 5272 2487. The site covers an area of approximately 0.5 ha and lies within an industrial complex at Seal Sands, Teesside, on the north side of the Tees Estuary.

The site is situated in an area dominated by heavy industry which includes oil and gas processing as well as chemicals and pharmaceutical manufacture. The nearest centres of population are located at Haverton Hill/ Port Clarence approximately 4.5 kilometres south west of the site. The nearest Site of Specific Scientific Interest (SSSI) and European site Special Protection Area (SPA) is the Teesmouth and Cleveland Coast, located directly adjacent to the site boundary.

A map of the site location and a site plan showing the installation boundary can be found in Appendix A. A site drainage plan and surface water drainage plan can be found in Appendix B.

Site History

Seal Sands site is situated within land owned by Conoco Phillips , the plant was built and commissioned in 1999 as a CCGT plant. There were subsequent upgrades in 2005 to provide CHP capability, with further upgrades in 2006 to fit dry low NOx burners ( DLN) and enable acceptance of Off gas from Conoco Philips.

The energy supply contract between RWE and Conoco Phillips ceased due to un-economical commercial operation via Conoco Phillips (CoP) in 2013 and from then on the plant operated up until 2022 as market conditions dictated. Due to business strategic review in 2020 and a downturn in the market, a decision was taken to close the site in September 2020. Following this decision a notification for cease of land lease was given to Conoco Philips in September 2020. The site closed March 31st 2022 to enable decommissioning/demolition to take place.

The plant comprised of :

* 1 GE F6 Gas Turbine (GT),
* 1 Heat Recovery Steam Generator (HRSG) and
* a Steam Turbine (ST). the GT exhausted via the HRSG to a single 50m stack.
* A high pressure (HP) Gas AGI with pressure reduction,
* CHP export steam and condensate capture,
* 2 cell cooling towers,
* CoP Off gas supply from Conoco,
* Chemical Dosing equipment and
* Balance of plant ancillaries.

2.0 Condition of Land at Permit Issue

At the time of permit application, site reconnaissance was undertaken by representatives of RWE on May 5th 2006. The purpose of the reconnaissance was to inspect the site and surrounding area for indicators of potential land contamination. Site infrastructure was visually inspected to assess its competence and potential to cause or have caused releases to land. There were no indicators of land pollution found on site.

In addition, a site condition report was produced to support the permit application and soil and groundwater analysis was undertaken. This can be found in Appendix C. The baseline soil and groundwater reference data can be found in Appendix D.

3.0 Permitted Activities

The Permitted Activities as listed in the current permit are given below.

(Table S1.1 from Permit CP3939QN)

**4.0 Changes to the Activity**

There have been no changes to the permitted activity or the permit boundary since the permit was issued. The most recent variation to the permit was in 2020 to incorporate BREF requirements.

**5.0 Measures taken to protect land**

The Seal Sands site operates a robust Environmental Management System (EMS) as part of an RWE Generation UK portfolio wide EMS. The EMS has taken all due consideration of Environmental Aspects and Impacts and strived to manage environmental risk appropriately with a continuous improvement philosophy at its core. The EMS is certified with Lloyds Register.

The Environmental Risk Assessment EPR H1 from the permit application in 2006 can be found in Appendix E.

The following extract from the Environmental Aspects Register shows the relevant potential sources of contamination to land associated with the permitted activity at the location.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ref | Category | Aspect | Source | Responsible |
| 773 | Land & Groundwater | Process chemicals (boiler water treatment chemicals, demineralisation plant chemicals) | Significant Environmental Aspects Evaluation | Site Manager |
| 763 | Land & Groundwater | Gas Oil | Environmental Permit conditions, Significant Aspect Evaluation | Site Manager |
| 757 | Land & Groundwater | Fugitive release from Sewer | Significant Aspects Evaluation & Legislation | Site Manager |
| 748 | Land & Groundwater | Fugitive release from Waste | Significant Aspects Evaluation & Legislation | Site Manager |
| 737 | Land & Groundwater | Transformer Oil | Significant Aspects Evaluation & Legislation | Site Manager |
| 717 | Land & Groundwater | Lubrication Oil | Significant Aspects Evaluation & Legislation | Site Manager |
| 706 | Land & Groundwater | Drainage System | Significant Aspects Evaluation & Legislation | Site Manager |
| 398 | Waste | Hazardous Waste | Aspect Evaluation, Stakeholder Concern, Legislation | Site Manager |
| 388 | Waste | Non-hazardous Waste | Aspect Evaluation, Stakeholder Concern, Legislation | Site Manager |

Each aspect was subject to a specific risk assessment which assessed the intrinsic risk, control measures that existed, and the residual risk after application of controls. These risk assessments are available on request. Site Operating Procedures were used to govern how the control measures were implemented at the location.

All oil and chemical tanks were subject to an pre inspection and maintenance programme (examples are available upon request).

**6.0 Pollution incidents that may have had an impact on land, and their remediation**

There have been no pollution events that may have had an impact on land. All environmental incidents and near misses are recorded in a central database (Madison). A list of all environmental incidents and near misses taken from the Madison system is included in Appendix G.

**7.0 Soil gas and water quality monitoring**

No soil gas or water quality monitoring has been undertaken as this was not identified as required in the ground investigation that was carried out.

There were no discharges to controlled waters from the power station. All process effluent, foul waste, surface and roof water run off all discharged to the host site CoP effluent systems.

**8.0 Decommissioning and removal of pollution risk**

The site was shutdown on 31st March 2022. The site closure has been completed in line with the Site Closure Plan version 5 (see Appendix H).

At time of submission, there have been no incidents during that would have resulted in contamination of ground or ground water during the decommissioning and demolition process.

As part of the asset transfer to CoP, the following items will remain on the plot:

* Black start diesel generator (containerised and bunded)
* Distillate fuel oil tank (bunded)
* Local Control Room Building
* 66-11kV transformer (within design bund)
* 11-3.3kV transformer (within design bund)
* 2 of 3.3kV-400V transformers (within design bund)
* Site drainage systems, pits and Klarjester on plant
* Effluent discharge system
* Remote control room, office buildings and stores including Klarjester

All the above items are not part of the demolition activities and are considered live. These items will be transferred to CoP on 30th September 2023 when RWE vacate the site.

A description of decommissioning process and removal of products and materials is below.

**Gas Pipeline National Gas to AGI**

* HP gas is supplied from National Gas (NG) compound within CATS terminal via 1.4KM pipeline. Isolation completed to RWE AGI FG107 (gas inlet valve), pipeline is purged and disconnected from NG network.

**On Site Gas AGI**

* On site AGI skid has a HP gas supply split into twin stream from pressure reduction (65 bar -30 bar); gas meter skid and dual stream pressure reduction for Potterton boiler house (4 industrial boilers, valves and pumps and closed heating system to gas pipeline heater). Within the compound is two huts: one for gas chromatograph and one meter to external provider (National Gas) for data telemetry.
* Both gas streams & pipework has be isolated, depressurised vented and purged with nitrogen and mainstream isolation valves removed and blanked.
* All AGI electrical/instrument and communications cables has been isolated, identified cut and dropped into the cable pit.
* A telephone line for NG metering from cubicle to control room under croft has been disconnected and cut and in bottom of cable pit. Legacy cable for data telemetry (Northern Gas network, before NG) IC1651 & IC1654 cables form RWE to AGI to CoP AGI has been isolated, identified, cut and placed in bottom of cable pit.
* Potterton boiler house twin stream reduction pipework has been removed.
* Potterton boiler water system has been depressurised and drained.
* Gas chromatographs disconnected. Calibration gases removed from site.
* Nitrogen & compressed air supply depressurised and pipework air gapped.

**Reduction gas pipeline to (plot) UGI section**

* Outlet pipework has been isolated, depressurised vented and purged with nitrogen.
* At AGI outlet, the discharge valve has been removed, the underground pipework has been disconnected and blanked at both ends of the UGI pipeline
* Fire detection system loops disconnected and placed in cable pits.

**Dry Gas Filter Skid to GT inlet**

* Gas supply UGI pipework riser blanked. Manual Isolation valve removed.
* Both dry gas filter gas streams & pipework has be isolated, depressurised vented and purged with nitrogen. Vessels opened and filters removed off site.
* All dry gas filter skid electrical/instrument and communications cables has been isolated, identified cut and dropped into the cable pit.
* Off gas inlet valve removed – all off gas supply pipework has been isolated, depressurised vented and purged with nitrogen.
* Nitrogen & compressed air supply depressurised and pipework air gapped.
* Fire detection system loops disconnected and placed in cable pits.

**Gas Turbine**

* GE Frame 6B 1.0 DLN converted 2006 – 40MW unit; 11KV 2 pole generator. 17 stage compressors with 3 power turbine sections.
* Gas pipework has been isolated, depressurised vented and purged with nitrogen. Manual isolation valves removed.
* All electrical (11kv-24v including DC supplied circuits) /instrument and communications cables has been isolated, identified cut and dropped into the cable pits at the front of the GT and rear Generator end. 11KV-415 including DC supplies cables have been identified, disconnected and air gapped within the appropriate switchgear.
* Compressed air supply depressurised and pipework air gapped.
* Water wash skid disconnected and drained.
* Lubrication oil removed and tanks cleaned, and lubrication/hydraulic filters removed. GT diesel day tank DFO storage drained, and tank cleaned. Diesel starter oil sump drained. Valves, actuators, bearings, motors, pump lubrication and grease pots removed.
* Gas Turbine oil tank contents removed from site by licenced contractor (waste transfer notes (WTN) included in Appendix I1)
* Off base Dollinger oil tank vapour extraction unit drained and contents removed by licenced contractor and included in above WTN.
* Off base oil purifier disconnected and removed.
* CO2 fire protection system disconnected, bottles depressurised, vent, valves disconnected and pipework air gapped.
* Fire detection system loops disconnected and placed in cable pits

**Gas Turbine CCCW**

* CCCW system for cooling Diesel starter loop, Lubrication oil tank coolers, flame scanners and generator coolers. (Water, glycol and inhibitor mixture). With two fin fan design cooler banks, one bank for GT generator and the other lubricating oil and diesel starter.
* Contents of system drained and removed off site by licenced contractor as part of routine collection of sump contents.
* Fire detection system loops disconnected and placed in cable pits.
* All skid electrical supply/instrument and communications cables has been isolated, identified cut and dropped into the cable pit.
* Pumps motor lubrication and grease pots removed.

**HRSG boiler**

* Stork HRSG conventional boiler 480 degrees C, 65 bar HP steam and IP steam 12 bar. Gt exhaust gases into boiler through to stack outlet. System consists of HP drum, IP drum, DA and associated pumps, motors actuators and valves.
* Boiler and ancillaries (IP & HP pumps, dosing and blowdown systems) has been fully depressurised, vented and drained.
* Fire detection system loops disconnected and placed in cable pits.
* All HRSG electrical supply (3.3Kv to 24v and DC supply /instrument and communications cables has been isolated, identified cut and dropped into the cable pit.
* Pumps, actuators, motors lubrication and grease pots removed.
* Emission monitor disconnected
* Safety shower disconnected and drained.
* All access doors have been opened and held with one bolt.
* Demin water tank drained, and door opened.

**Chemical storage and dosing tanks**

The site utilised the following chemical storage and dosing tanks:

* 15% Sodium Hypochlorite Biocide tank – CW Tower
* Inhib 25 Dispersant tank – CW tower
* 99% Sulphuric Acid tank - CW tower
* 5% Ammonia tank HRSG Boiler
* Disp 9 Phosphate tank HRSG boiler

All tank contents were utilised prior to closure, tanks and associated pipework purged and pumped with water, with exception of the INHIB 25 tank which was soapy washed via Veolia. The acid tank was purged via Veolia and contents removed off site (WTN in Appendix I2).

The status of other related aspects is as follows:

* Tanks remain open to atmosphere.
* Safety shower disconnected and drained.
* Pumps, actuators, motors lubrication and grease pots removed.
* Fire detection system loops disconnected and placed in cable pits.
* All dosing electrical supply/instrument and communications cables has been isolated, identified cut and dropped into the cable pits at HRSG front and CW sump area.

**Steam turbine**

* Steam turbine building contains MCC, control room, crane, ancillary equipment, ABB steam turbine 18MW HP steam and IP steam inlet LP blades exhausting into condenser. Generator is 11KV 4 pole generator.
* All electrical (11kv-24v including DC supplied circuits) /instrument and communications cables has been isolated, identified cut and dropped into the cable pits at the front of the Effluent pit. 11KV-415 including DC supplies cables have been identified, disconnected and air gapped within the appropriate switchgear.
* Compressed air supply depressurised and pipework air gapped.
* CCCW generator cooler and CW systems depressurised, vented and drained.
* Sumps pumped out and Condensate sump pumped out.
* Lubrication oil removed, and tanks cleaned, and lubrication/hydraulic filters removed. Rexroth and Hydac hydraulic system depressurised, vented, drained and tanks cleaned. Valves, actuators, bearings, motors, pump lubrication and grease pots removed.
* Off base oil purifier disconnected and removed.
* Hydrant fire protection system disconnected, and pipework removed.
* Fire detection system loops disconnected and placed in cable pits.
* CoP fire system beacon cables identified and cut on pipe bridge
* HP steam export valve disconnected and blanked (CHP export skid DWA013).
* Demin and process water valves and pipework’s removed and air gapped.

**CW tower**

* The CW towers are a hybrid 2 cell design tower, with bund and pump sump area. The material is designed from tanalised wood and pack material.
* CW tower and systems have been fully shocked dossed.
* Gearboxes, Pumps, actuators, motors lubrication and grease pots removed.
* Fire detection system loops disconnected and placed in cable pits.
* All electrical supply 3.3kv to 24v /instrument and communications cables has been isolated, identified cut and dropped into the cable pits at CW sump area.
* CT tower dosing tanks/pipework empty, purged and disconnected.
* Compressed air has been disconnected and air gapped.

**CHP Plot**

* CCGT plant was upgraded 2005 for inclusion of CHP capability. Thus consisted of HP steam export pipework; desuperheating station, CHP switch room/control room, condensate return package with tanks and atmosphere vessel, CoP off gas supply skid for mixing Natural gas and ethane rich gas. This included a gas chromatograph.
* CoP off gas has been isolated, vented, purged with nitrogen and supply valve and vent valve has been blanked. CoP has also disconnected the off-gas supply by removing a T piece spool and blanks. CoP vent line has also been purged via CoP. Off gas pipework is air gapped all the way to the GT Dry gas filter skid.
* HP steam isolation MOV valve and bypass valves have been dome ended and radiation NDT completed.
* HP steam pipework warming line for CoP disconnected, dome ended, and radiation NDT completed.
* Condensate water return has been isolated and supply valve blanked with air gap. Condensate vessel access doors removed.
* Compressed air and nitrogen supply depressurised and pipework air gapped.
* Fire detection system loops disconnected and placed in cable pits.
* All electrical supply 415v to 24v /instrument and communications cables has been isolated, identified cut and dropped into the cable pits at Effluent sump area.
* 870DCS 013 & 870DCS014 communication cables to CoP have been isolated, identified and cut. This includes HP steam temperature X989 cable.
* Gas chromatograph disconnected and calibration bottles removed.

Five pipelines with valves and support will remain after demolition with pipe supports:

* HP steam line
* Off Gas vent and supply line
* HP warming line
* Condensate line

**Pipe bridge TP Connections (Cross boundary)**

The contract Terminal points are within COP land however we have agreed a new terminal point for demolition and asset transfer purposes, rear North side of ST building. It consists of:

* Demin water supply – bridge valve isolated, disconnected, blanked and air gapped
* Process/Raw water supply – bridge valve isolated, disconnected, blanked and air gapped.
* Air supply – bridge valve isolated, disconnected, blanked and air gapped.
* Air supply to CHP plot North on pipe rack to be removed as part of demolition.
* Nitrogen supply - bridge valve isolated, disconnected, blanked and air gapped.
* Nitrogen supply pipework to CHP plot North on pipe rack to be removed as part of demolition.
* Effluent discharge – water system live.
* ESD (legacy) Cables x25 – Cables isolated, disconnected, identified and cut.
* 3 fibre cables – Cables isolated, disconnected, identified and cut.
* 1 telephone cable CoP internal – Cables isolated, disconnected, identified and cut.
* 1 CoP fire system cable – Cables isolated, disconnected, identified and cut
* HP Steam to CoP - blanked and will be left as asset transfer on North of pipe rack.
* HP Steam from ST - shall be removed as part of demolition south direction on piperack.
* HP warming line from CoP - blanked and will be left as asset transfer on North of pipe rack.
* Condensate return from CoP - blanked and will be left as asset transfer on North of pipe rack.
* Condensate water return to RWE shall be removed as part of demolition south direction on pipe rack.
* Off gas supply and vent line - blanked and will be left as asset transfer on North of pipe rack.
* Off gas supply to GT mixing skid – shall be removed as part of demolition south direction on pipe rack.
* Desuperheater pray water from DA - shall be removed as part of demolition south direction on pipe rack.

Other site service such as potable water under pipe rack near air receiver supply will remain in place, as it is feeding CoP project area. After isolation valve to safety showers has been disconnected and blanked.

Compressed air receiver has been depressurised, vent and drained, air gapped.

Fire detection system loops disconnected and placed in cable pits.

**Site drainage – (in Service)**

The site is designed and levelled to collate site water via surface drains, HRSG blowdown pits and sumps, into the oily water interceptor, onto the effluent pit. This is discharged via a level system and pump controls via DCS.

All site process chemicals and oils have been removed from site.

Effluent pumps, controls, sampling is all left live until further notice. Effluent will stay in place for the duration of the demolition.

All electrical supply and control/instruments cables are low level are protected.

**9.0 Reference data and remediation**

In 2020, a ground investigation was undertaken to assist in the determination of the environmental baseline in line with the requirements of Directive 2010/75/EU on Industrial Emissions (IED).

The ground investigation concluded although there were detectable concentrations of a number of contaminants recorded in the soil and groundwater samples, no significant pollution linkages are considered to be present due to these concentrations. This assessment considered the environmental settling of the site, the pollution prevention and mitigation measures adopted and the generally low/ negligible concentration recorded for most of the contaminants of concern.

 It was considered that no significant contaminant concentrations were identified at the site that may be associated directly with the permitted activities, and that these concentrations indicate the general background / baseline conditions. Therefore, it was considered that no additional investigation and/or monitoring was required, other than the requirements specified in the environmental permit CP3939QN.

A copy of this report can be found in Appendix F.

There was not a requirement to undertake any additional land or ground water samples as part of this surrender application.

**10.0 Statement of site condition**

Permitted activities ceased in March 2022 with only clerical and electrical infrastructure maintenance taking place on site from this time onwards. During the operation of the power plant there have been no environmental incidents that have resulted in contamination of ground or ground water.

Decommissioning and removal of potentially polluting substances from site has been completed and demolition activities commenced in May 2023. During the decommissioning process there have been no incidents that would have resulted in contamination of ground or ground water.

RWE commissioned a ground investigation in 2020. The results of this investigation show that the land at the Seal Sands Power Station site has not deteriorated since the site was commissioned and the land is in a satisfactory state.

Consequently RWE are of the view that there are no barriers to surrendering the environmental permit for Seal Sands CHP.

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