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SUMMARY RISK ASSESSMENT REPORT FOR SOIL AND GROUNDWATER CONTAMINATION AT CONNAH'S QUAY POWER STATION IN RESPONSE TO LCP BREF REGULATION 61 NOTICE

**prepared for
CONNAH'S QUAY POWER STATION
by
A Devonish**

SUMMARY

This report has been produced in response to a Regulation 61 requests issued by Natural Resources Wales (NRW) on the 9th May 2018 and is in response to question 7 in that notice.

Question seven requires:

Where your activity involves the use, production or release of relevant hazardous substances (as defined in Article 3(18) of the Industrial Emissions Directive) carry out a risk assessment considering the possibility of soil and groundwater contamination at the installation with these substances. Where any risk of such contamination is established either:

- a) Prepare and submit a baseline report containing information necessary to determine the current state of soil and groundwater contamination;*
- or*
- b) Provide a summary report referring to information previously submitted where you are satisfied that such information represents the current state of soil and groundwater contamination;*

Uniper UK has carried out a risk assessment and concluded that taken into consideration the activity on site, the previous ground investigations and protection measures on site a baseline report does not need to be produced for Connah's Quay.

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GLOSSARY

ASR	Assessment of Land Pollution Potential
Bgl	Below Ground Level
CCGT	Combined Cycle Gas Turbine (CCGT)
CQ	Connah's Quay Power Station
EPR	Environmental Permitting Regulations
HCL	Hydrochloric Acid
IED	Industrial Emissions Directive
IPC	Integrated Pollution Control
KVA	kilo-volt-ampere
LCP BRef	Large Combustion Plant Best Available Techniques Reference Document
NRW	Natural Resources Wales
PCBs	Polychlorinated biphenyls
PFA	Pulverised Fuel Ash
SCR	Site Condition Report
SPMP	Site Protection and Monitoring Programme
SSSI	Site of Special Scientific Interest
WTP	Water Treatment Plant

1 INTRODUCTION

1.1 Background

New requirements under the Industrial Emissions Directive (IED) require an installation site to periodically monitor soils and groundwater throughout the operational life under the permit. Previously this was only done at permit application, and again at surrender to create and review the Site Condition Report (SCR).

This report reviews existing available information for the state of soil and groundwater contamination at Connah's Quay Power Station (CQ), identifies areas of known and potential contamination and presents a data assessment of risk and likelihood of contamination being present now and in the future. Environmental management systems pertaining to the protection of soil and groundwater through procedural and physical preventative measures in abating manifestation of contamination incidence is also presented.

1.2 Directive Requirements

Under the IED there is a requirement (through Article 14), for the *“regular maintenance and surveillance of measures taken to prevent emissions to soils and groundwater...”* This is achieved through periodic monitoring of groundwater and soil on the installation site throughout the operational period of the permit *“... in relation to relevant hazardous substances likely to be found on site and having regard to the possibility of soil and groundwater contamination at the site of the installation”*.

Article 11 of the directive drives this by requiring *“all the appropriate preventative measures are taken against pollution...”* and that *“no significant pollution is caused.”* It goes on to require that at the definitive cessation of activities at the site it is returned to a satisfactory state and avoids any risk of pollution.

The underlying aim of the requirement is that any deterioration of the site quality from the baseline established at permit application can be identified earlier in the operational phase, and remediated (or at least monitored and prevented from getting any worse). This periodic monitoring is a new requirement in addition to the ground investigations undertaken at the permit application and surrender to create and review the Site Condition Report (SCR).

To inform this new requirement in Wales, Natural Resources Wales (NRW), as the responsible regulatory authority, sources information from installation sites via the Environmental Permitting (England and Wales) Regulations 2016, Regulation 61(1).

1.3 Regulation 61 Statutory Notice

CQ has received a Regulation 61 Statutory Notice (Appendix A) to supply information to NRW in relation to the LCP BRef (Large Combustion Plant Best Available Techniques Reference Document). This notice requests:

Where your activity involves the use, production or release of relevant hazardous substances (as defined in Article 3(18) of the Industrial Emissions Directive) carry out a risk assessment considering the possibility of soil and groundwater contamination at the installation with these substances. Where any risk of such contamination is established either:

- a) *Prepare and submit a baseline report containing information necessary to determine the current state of soil and groundwater contamination;*

or

- b) *Provide a summary report referring to information previously submitted where you are satisfied that such information represents the current state of soil and groundwater contamination;*

so as to enable a quantified comparison to be made with the state of soil and groundwater contamination upon definitive cessation of activity.

Where you have concluded that there are no risks of soil or groundwater contamination, provide a copy of the risk assessment.

Uniper UK has carried out a risk assessment and concluded, that taking into consideration the activity on site, the previous ground investigations and protection measures on site, a baseline report does not need to be produced for the EPR Permitted area of CQ.

This report forms part of the response to the Regulation 61 Notice No. 7, in the form of a soil and groundwater contaminated land risk assessment summary report, referring to previous studies undertaken at the site and relevant sources of information.

Information has been sourced from previous reports to inform the Regulation 61 response for the possibility of soil and groundwater contamination from the production or release of relevant hazardous substances (as defined in Article 3(18) of the Industrial Emissions Directive (IED).

The sources of information used for risk assessment to determine possibility of soil and groundwater contamination from the production and use of hazardous substances (current and historical) are detailed in Appendix B.

A qualitative risk assessment of potential soil and groundwater contamination is based on desk study information. The full details of the risk assessment are included in appendix C. Information sources identify the 'relevant hazardous substances' used/produced/released on site, and details their station designation, volume, location, secondary, tertiary and quaternary containment (where applicable) and if the substance is stored below or above ground. The information also includes details of previous contamination incidents at the site and where remediation and validation measures have taken place to abate associated environmental and human health risks.

Source, pathway and receptors are identified and the historical land uses included. The environmental setting (geological, hydrogeological and hydrological) data for the site is also detailed in Section 3.

2 SITE

2.1 Connah's Quay Power Station

Uniper UK Limited (Uniper) owns and operates Connah's Quay Power Station (CQ), a 1,360 MWe gas-fired Combined Cycle Gas Turbine (CCGT) generating station, located west of Connah's Quay in Flintshire, north Wales.



Figure 1: Aerial Imagery of Connah's Quay Power Station (orientation North)

The Site comprises two separate land parcels that collectively cover a total land area of approximately 93.6ha over 4 Zones. The current and old power station sites are located to the immediate south of the River Dee and its estuary, with National Grid occupying the area between the two parcels of land.

The gas used to fuel the power station is transported to site either through the National Transmission System or an 18-mile long, 24in diameter main pipeline from the Point of Ayr Gas Terminal, where gas comes from ENI Billiton's Celtic gas fields (Hamilton and Hamilton North) in Liverpool Bay via the Douglas Complex.

Connah's Quay was issued with an environmental permit in 2007 and the permit was varied in 2015 to take into account the requirements of the Industrial Emissions Directive.

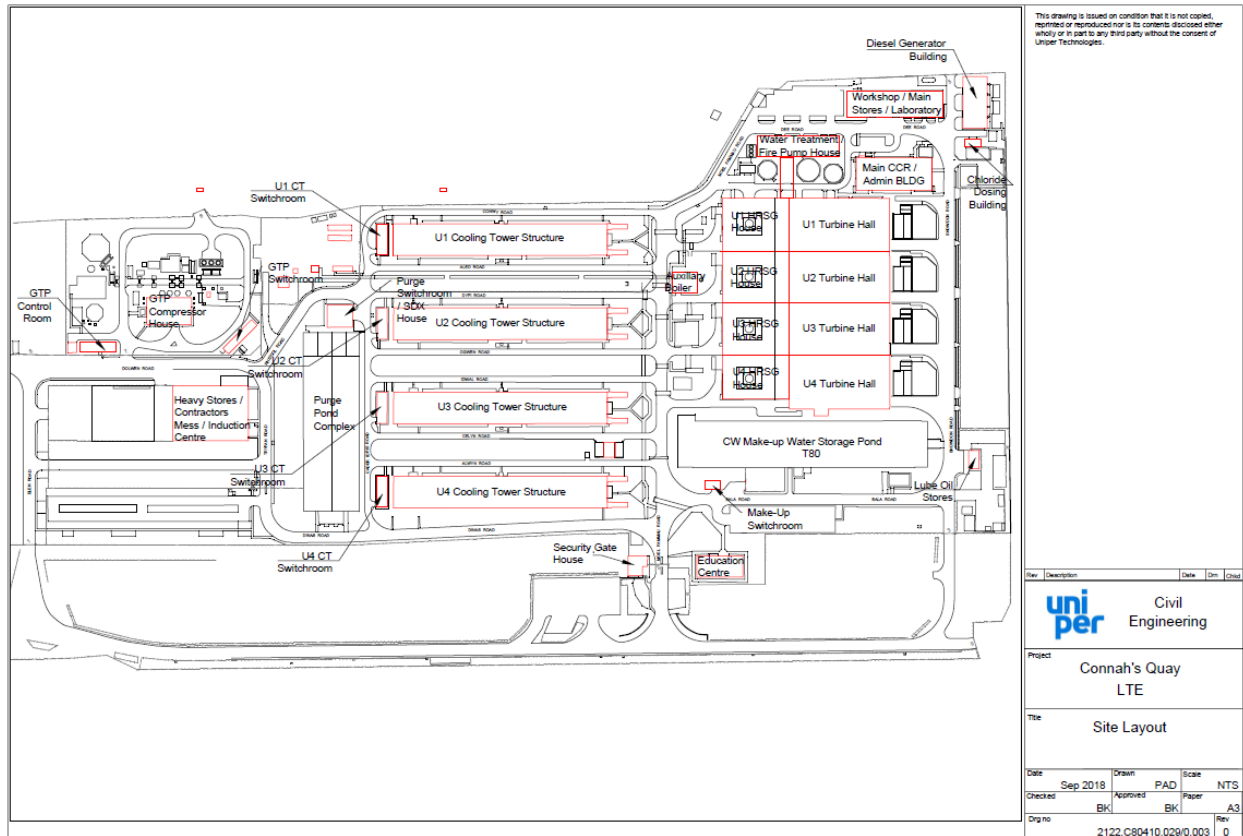


Figure 2: Connah's Quay Power Station Site Layout

2.2 Site Zones

Within this report and as shown in Appendix B the Site has been split into 4 main zones as per Table 1 and Figure 3. The zones have been defined either spatially, by common use, or by potential contaminant profile, and in each case the nature of activities undertaken and structures identified within each zone have been broadly summarised.

Table 1: Connah's Quay PS Areas

Zone	Zone Name
1	Nature Conservation and Surrounding Land
2	Cooling Towers, Water Processing and Gas Plant
3	Power Station Turbine and Boiler Houses
4	Former Demolished Power Station Site

Zone 1 – Nature Conservation & Surrounding Land

Representing an area of approximately 56.3ha comprises largely grassland, non-permit power station land and nature conservation land (SSSI).

This Zone lies outside of the currently active power station's permitted installation boundary and is not considered further in this assessment.

Zone 2 – Cooling Towers, Water Processing & Gas Plant

Covers an area of approximately 14ha and comprises the power station's hybrid cooling towers, gas treatment plant, water storage / purging tanks and sewage plant.

All sections of this Zone lie within the CQ's permitted installation boundary.

Zone 3 – Power Station Turbine & Boiler Houses

Occupies an area of approximately 7.8ha and includes the power station turbine and boiler houses, transformers, waste oil and foul drainage systems, fuel / oil and chemical storage, administrative and office buildings, stores, workshops and waste storage areas.

This Zone lies wholly within the CQ's permitted installation boundary.

Zone 4 – Former Demolished Power Station Site

Occupies an area of approximately 15.5ha and comprises the former power station. Whilst the site has been demolished to ground level, concrete foundations, sub floor structures and low-level walls of the former cooling tower area and rail tracks are present onsite.

This Zone lies outside of the currently active power station's permitted installation boundary and is not considered further in this assessment.



Figure 3: Connah's Quay Power Station Site Boundary and Zones 1-4

3 ENVIRONMENTAL SETTING

3.1 Site

Connah's Quay Power Station is located adjacent to the River Dee Estuary in North Wales.

3.2 Geology

Geology of the site was defined during pre-construction investigations and summarised in the 1991 Environmental Statement. Information is also sourced from British Geological Survey maps.

The site is underlain by a series of superficial deposits consisting mainly of Made Ground, Alluvium and River Terrace Deposits (Minor aquifers) and Marine Silts. Mercia Mudstone Group (Non- Aquifer) underlain with the Sherwood Sandstone Group (Major Aquifer).

Made Ground

Made Ground has been recorded across the Site during previous site investigations, mainly comprising dark grey sandy clay and clayey sand with gravel and clinker with bands of dark grey PFA. Thickness of made ground ranges from 1.6m to 4.0m in Zones 1-3.

Crushed materials from the demolition of the former Connah's Quay Power Station in Zone 4 may have been used to raise site levels and fill in depressions within Zone 4. Previous investigations indicate an upper layer of 0.3-2.4m of granular made ground with occasional concrete, brick and ash overlying a layer of 1.0-2.7m of silty sandy made ground which is interpreted to be the sand dredging from the 1960s.

Historical map evidence infers that Zones 1-3 were extensively land raised with the deposition of PFA across the Zones. This has been confirmed through site investigation.

It should be noted that during construction considerable land raising, basement excavation and deep foundations have been constructed associated with the power station's development.

Considering this, it has been assumed that in localised areas, sub-surface made ground associated with over excavations may well be present to far greater thicknesses than currently identified.

Superficial Geology

Zones 1-3 of the Site are underlain by superficial deposits mainly consisting of Alluvium comprising grey brown medium to coarse sand with occasional gravel, fragments of coal and shell and occasional bands of silt and laminated clays at depths of between 9.7 and 19.7m below ground level (bgl).

Boreholes drilled within the channel of the River Dee were reported by WS Atkins in their 2000 investigation report as containing glacial till underlying the alluvial deposits. The till was reported as comprising firm to stiff red brown sandy clay with gravel and was encountered at depths between 11.8m and 20.2m bgl.

Bedrock Geology

Pennine Lower Coal Measures comprising interbedded mudstones, siltstones and sandstones are present at varying depths below the superficial drift. Previous investigations across Zones 1-3 recorded depths to rockhead as 9.7m to 20.2m below ground level (bgl).

3.3 Hydrology

Surface Waters

The nearest surface water features are the River Dee, Saltmarsh and Estuary within northern areas of Zones 1-4 and ponds and drainage ditches within and running along southern and western areas of Zone 1.

Several drainage ditches surround the Site, one of which enters the site from the south in Zone 1 / 2 and is culverted across central areas of the site (Old Rockcliffe Drain) and discharges adjacent to the main site discharge point W1 in the north by the River Dee.

Site Drainage

Connahs Quay uses appropriate arrangements to protect or divert the existing drains and watercourses passing under the site. The drainage system incorporates measures to protect against contamination e.g. oil separators, bunds, interceptors, sumps etc.

There are several surface water, oily water and foul drainage systems present at the Site, which are routed via a system of site interceptors located across the site.

All surface water, including firefighting water is directed to the Power Station drainage system. Other solid or liquid releases from the process are handled in the Power Station system. Interceptors and mechanical isolation systems are also in place (e.g. penstock emergency control drainage system) to separate contaminated water from inappropriate discharge to environmental receptors such as the River Dee.

3.4 Potential Contamination Sources

Table 2 identifies the substances (relevant to Article 3(18) of the Industrial Emissions Directive) and Article 3 of Regulation No 1272/2008), and location, that have the potential to cause or have caused contamination. Where specific contamination is known or suspected and where associated with a pollution event or other evidence, a specific building or location is listed. The likelihood of contamination of underlying soils and groundwater that may be present given the nature of the activities undertaken historically and currently, are also provided for each zone.

Table 2: Summary of On-Site Potential Contaminant Sources

Zone	Building/Location	Potential Contaminants
Zone 2.1	Oily Water Drainage Routes & Interceptors	Various Hydrocarbons, possible PCBs
Zone 2.2	Gas Treatment Area – Fuel Storage & Compressors	Various Hydrocarbons
Zone 2.3	Hypochlorite Tubes Within Cooling Tower Area	Inorganics
Zone 3.1	Oily Water Drainage Routes & Interceptors	Various Hydrocarbons, possible PCBs
Zone 3.2	Diesel Tanks & Generators, Oily Water Interceptors	Various Hydrocarbons
Zone 3.3	Transformers, Sumps & Cable Runs	Various Hydrocarbons, possible PCBs
Zone 3.4	Turbine Hall Lube Oil / Sumps and Oily Water Drainage Routes	Various Hydrocarbons
Zone 3.5	Waste & Chemical Storage Areas, Oil & Waste Oil Storage, Lube Oil Compressors	Various Hydrocarbons
Zone 3.6	SDX Pump Chambers, Temporary Boiler Area, Blowdown Pits, Auxiliary Boiler House	Various Hydrocarbons, Inorganics
Zone 3.7	Water Treatment Plant, Former Acid Leak Area*, Effluent Treatment Tanks, Chemical Tanks	Inorganics, Metals

This list has been further defined to specific substances as potential contamination and pollution sources that focuses on the EPR permitted area for CQ operation (Zones 2 and 3). For completeness Appendix C includes all materials at CQ and is not limited to those which are relevant to Article 3(18) of the Industrial Emissions Directive and Article 3 of Regulation No 1272/2008.

3.5 Pollution Incidents to Land

We have carried out a review of our incidents at CQ since 2007 to identify those with the potential to cause pollution of ground or ground water, these are set out in table 3 below.

Table 3: Pollution incidents with the potential to cause pollution of ground or ground water.

Location	Pollutant	Date
Onsite	Hydrochloric Acid Leak Through Bund	2013

There is one minor incident involving an acid leak to ground, following a breach to secondary containment at the end of 2013. Following the incident appropriate improvements were implemented in procedural generation management instructions to prevent any future reoccurrence. It is considered very unlikely that escape of hazardous substance(s) from primary and secondary containment measures will occur again. Information on this incident is reported in more detail below.

Hydrochloric Acid Tank Bund Incident 2013

On the 16th September 2013 a weekly bund inspection of the CQ site was carried out. It was identified there was an unusual substance present in the bottom of the bulk hydrochloric acid bund (HCl). On investigation it was identified that there had been a breach of the HCl bund. Immediate actions were put in place to deal with the acid and the surrounding area.

The immediate response to the incident involved the emergency response contactor attending site to remove the residual acid within the bund and remove the contaminated soil from around the bund. Impacted material comprising soil and stone chips were removed and disposed of offsite. The base and sides of the remaining excavation outside of the bund was validated to evidence remediation. Analysis of the soil and stone chips outside of the bund identified low pH materials.

The investigation identified that there was a defect in the coating applied to the surface of the bund. This defect was located at the point where the sump meets the bund floor. The fault could have been caused either by poor application of the coating at this point or by damage- caused by the sump metal grid repeatedly rubbing the surface, causing cracking. This fault in the coating would have allowed the acid to attack the concrete.

The acid then flowed into the SDX drains adjacent to the bund. This belief is supported by a reduction in the pH in the chemical drainage system (SDX) on the 12th September 2013.

The underlying geology of the site is such that the acid would not have soaked into the ground, the soil just below the area outside the bund is clay and river silts, this would have acted to retain the acid in one place. The total loss of acid from the tank was calculated to be 1.9t.

Repair of Hydrochloric Acid Bund

Repairs involved washing out and removal of potentially contaminated material, removal of the floor surface above the damaged area, preparation of the concrete surface, shuttering of the blind sump, casting replacement floor slab and application of a primer and suitable acid resistant coating.

3.6 Site Protection and Monitoring Programme

CQ employs Site Protection and Monitoring Programme (SPMP). The objectives of the SPMP are to:

- Monitor the effectiveness of infrastructure and management procedures and provide a warning of loss of containment.
- Assist at permit surrender, to confirm no loss of pollutants from the site.

SPMP: Infrastructure Monitoring Programme

The infrastructure monitoring programme includes regular assessment, recording and reporting of monitoring results. This is facilitated by a company computer based maintenance management system (SAP), which generates work orders and programmes, as well as recording sign off from completed actions and plant history. Items in place include:

- Suitable bunding surrounding all tanks which may contain potentially polluting substances.
- A regular inspection programme to ensure all bunds are empty and there are no leaks or damage.
- Interceptors to process collected surface waters to prevent loss of oil to drainage.
- A regular inspection programme for relevant interceptors.
- A planned preventative maintenance programme to all major items of equipment.
- Service intervals for major pieces of plant in line with manufacturer's recommendations.
- An environmental management system, certified to ISO 14001: 2015.
- Documentation for accident response procedures in event of an environmental or other accident.
- Inspection and maintenance programmes for areas of hard-standing across the installation.
- Inspection and maintenance programme for areas of waste storage across the installation.
- The computer based maintenance system ensures the continued regular recording and reporting of maintenance results and allows site operatives to maintain close control and record of plant maintenance issues.

The assessment procedure for the identification of potentially polluting activities is based on the company's Engineering Risk Management Standard PEM 218 *General Civil Structures and Infrastructure*. This sets specifications for engineering inspections of tanks and bunds, and alongside information from the existing ASR- *Assessment of Land Pollution Potential* a table of Infrastructure Monitoring and Inspection Programme has been drawn up.

The infrastructure monitoring programme data is stored on the site computer based maintenance management system. Details of any plant items that are rendered redundant and decommissioned is recorded in the plant closure file. This records the location, condition and contents and any other information that may be of use when the Environmental Permit is surrendered.

Areas of Hard-standing

The site areas of hard standing are inspected annually.

Table 4: Areas of Hard Standing

Identification	Location	Visual Examination	Civil Examination	Engineer
HS 1	CTE Tanker Off Loading bay	One Year Inspection by Engineer	Five Yearly	
HS 2	CTI Tanker Off Loading bay	One Year Inspection by Engineer	Five Yearly	
HS 3	Water Treatment Plant Tanker Off Loading bay	One Year Inspection by Engineer	Five Yearly	
HS 5	Car Parks	One Year Inspection by Engineer	Five Yearly	
HS 6	Turbine Halls Units 1-4	One Year Inspection by Engineer	Five Yearly	
HS 7	HRSO Halls Units 1-4	One Year Inspection by Engineer	Five Yearly	
Identification	Substance	Location	Tank Inspection Frequency	
HS 8	Gas Treatment Plant	One Year Inspection by Engineer	Five Yearly	
HS 9	Lub Oil Store lay down area	One Year Inspection by Engineer	Five Yearly	

Oil Interceptors

The site oil interceptors are inspected a minimum of every six months.

Table 5: Oil Interceptors

Identification	Location	Inspection/ clean	Full examination and integrity check
Int 1	Admin Block SPEL No. 300 series	6 month	Five Yearly
Int 2	Water Treatment Plant SPEL No. 100 series	6 month	Five Yearly
Identification	Location	Inspection/ clean	Full examination and integrity check
Int 3	East end U1Cooling Tower SPEL No. 300 Series	6 month	Five Yearly
Int 4-6	Access Road E&W Klargester KB3/4 and outlet chamber	6 month	Five Yearly
Int 7	Gate to Contractor's Compound CONDER 3 stage Series A	6 month	Five Yearly

Int 8	New Stores (opp football pitch) SPEL No. 300 Series	6 month	Every 5 Years
Int 9	Gas Treatment Plant SPEL	6 month	Every 5 Years

Site Surface Water Drainage

The site drainage system is subjected to a 3-5 yearly inspection.

Table 6: Site Surface Water Drainage

Identification	Location	Full examination and integrity check
SXS	Site	Every 5 Years
SXS Discharge Valves UV001 UV002	Site Drainage	Every 5 Years

3.7 Environmental Monitoring Programme

In addition to the SPMP CQ has a monitoring programme that would identify any incidents that may cause an impact on the environment. This is employed through generation management corporate instructions and procedures, namely Environmental Incident Management Plan (CQCP1008), Generation Management Instruction MAN013 and the Emergency and Business Continuity Plan (EBCP). If it is assumed or discovered that potential pollution to ground has occurred, then additional extraordinary environmental monitoring is employed to identify the possibility of any pollutant loss. Additional monitoring of aqueous discharges, site groundwaters, and potential infrastructure damage is duly considered, following discussions with NRW, who are consulted from the moment of incident notification.

4 RISK ASSESSMENT

4.1 Background

The risk assessment sources information from previous studies and reporting information to identify hazards and risk factors that have the potential to cause harm to human health and environmental receptors. Analysis and evaluation of the risk associated with any specific hazard informs the quantification of the risk at hand.

Appendix C details potential contaminant linkages, considering each of the contamination sources, pathways and receptors identified, and provides an indication of the likelihood of pollution / contamination

The risk level detailed within the table has been assigned based upon the following criteria:

- High Likelihood of Pollution (High Risk) – Identified as a contaminant which could cause significant harm and / or has a significant potential to pollute controlled waters.
- Reasonable Likelihood of pollution (Moderate Risk) – Identified as a contaminant which can cause significant harm but is likely to be contained and / or relatively immobile.
- Little Likelihood of Pollution (Low Risk) – Identified as a contaminant which is unlikely to cause significant harm and is likely to be contained and relatively immobile

and consideration of environmental management measures apportioned to site.

The processes, activities and substances associated with the operation of a gas fired power station bring inherent potential risks of soil and groundwater contamination, particularly from hazardous substances stored, transferred and utilised on site to support power generation plant.

Many areas of the Site are covered in concrete and tarmac hardstanding, particularly within Zones 2 and 3. The presence of concrete hardstanding limits the potential for pollutants entering the soil and groundwater. Storage vessels raised above ground level also makes identification of leaks or spillages and visual inspection easier.

The production or use of relevant hazardous substances require storage within vessels and tanks on site, many of which have levels of containment to prevent escape e.g. secondary containment and alarm notifications. Should an escape surpass primary and secondary protective measures further control is provided by bunding, interceptors, sumps and hardstanding as tertiary containment. The likelihood of escape of hazardous substances and contamination of soil or groundwater is considered low risk or unlikely.

Environmental protection measures are supplemented by Generation Management Instruction procedures for all Uniper UK generation sites. There are regular checks carried out at CQ, including civil inspections, plant routines and weekly bund checks. CQ also has a procedure for the Outside Duties Operator which includes bund inspections daily. In addition to the checks carried out by operators, there are annual and five yearly integrity checks. The Site Pollution and Monitoring Plan (SPMP) which forms part of the site's Environmental Permit issued by NRW, requires a yearly integrity check of bunds and tanks. There is also a Generation Management instruction regarding inspection of civil structures including bunds. GMI PEM 218 requires civil structures including bunds to have a 2-yearly inspection by a site engineer and professional assessment every five years. Routine monitoring and inspection procedures help inform outage and maintenance requirements for the site, highlighting any necessary repair work.

The above monitoring, maintenance and repair procedures provide quaternary containment, ensuring environmental protective measures installed and applied on site remain sufficient in preventing contamination to soil and ground water from hazardous substances now and in the future.

Any unlikely escape of contaminant will be short term where instances of spillage or escape occur and will be mitigated through the adoption of Safe Systems of Work including Risk Assessments, Method Statements and associated mitigation measures.

Based on existing site industrial usage, site information and the distance to off-site potential sources of contamination, assessment of off-site areas has not been further considered. The low likelihood, low scale of contamination and lack of contaminant mobility make off site areas unlikely to be a source of contamination to soil and groundwater to the Site.

5 CONCLUSION

This report forms part of the response to the Regulation 61 Notice in the form of a soil and groundwater contaminated land risk assessment summary report, referring to previous studies undertaken at CQ and environmental management procedures prevalent to the installation.

Prior to construction of CQ and during the operation of the site, various investigations and risk assessments have been undertaken to inform and characterise the possibility of hazardous substances utilised on the Site of causing soil and groundwater contamination.

Several investigations have concluded that significant pre-existing contamination underlying the Site is unlikely. Inorganic substances associated with PFA (e.g. sulphates, trace metals) may be present within the Made Ground deposits but are unlikely to form a significant source of environmental risk.

Hazardous substances stored and utilised on site are inherent of a gas fired power station. The installation employs comprehensive systematic containment and environmental management measures of its pollution control civil infrastructure to ensure the protection of soil and groundwater. These measures are routinely inspected, audited and maintained to ensure suitability and that the design is compliant with environmental legislation, guidance and best practice.

This document detailed the pollution control infrastructure monitoring and inspection programme for the installation that ensures protection of soil and groundwater.

Uniper has recorded the condition of the soil and groundwater at CQ over time. Any pollution incidents have been recorded and reported to relevant regulatory authorities and where contamination has occurred this has been remediated. Uniper has protected land and groundwater during its ongoing tenure of the site and will continue over the lifetime of the site/permit. Uniper will ensure the SCR is updated during the lifetime of the permit and that land is in a satisfactory state when Uniper come to surrender its permit.

Uniper is satisfied that the sources of information represent the current state of soil and groundwater at CQ and enable a comparison to be made upon definitive cessation of energy generation for permit surrender.

Uniper also understand that while the presence of historical contamination may not require remediation under the permitting regime for surrender if the pollution can be demonstrated to pre-date the permit, Uniper may still be liable for remediation under other legislation such as the contaminated land regime (e.g. Part IIA of the Environmental Protection Act 1990).

The site would unlikely be classified as 'contaminated land' under Part IIA of the Environmental Protection Act (1990) and that Made Ground underlying the site presents a low risk to the environment.

Uniper consider that there are no risks to soil or groundwater contamination and this is supported by Appendix C.

However, Uniper recognise that with all the protective containment measures and management procedures in place, there remains a risk, that even in these areas, surface spills may surpass containment measures resulting in potential land contamination. The key pathways through which contaminants could enter soils and groundwater are potentially through leaking drain connections, expansion joints, utility connections, sumps, interceptors and as well as through undetected cracks and defects in hardstanding. While recognised as a potential possibility the risk is considered low and unlikely while the SPMP is fully adhered and implemented alongside Generation Management Instructions that establish routine scheduled monitoring, maintenance and environmentally benign operational procedures.

Uniper UK have carried out a risk assessment and concluded that taking into consideration the activity on site, the previous ground investigations and protection measures, a baseline report does not need to be produced.

APPENDIX A

NRW Statutory Notice Regulation 61 Request

APPENDIX B: Summary of Previous Reports for CQ Permitted Site Area

Previous Ground Investigation Surveys at CQ for Permit Area

- Groundsure Geo-insight and Data Reports
- Environment Agency website for floodplain maps and Source Protection Zones (SPZs)
- Layout and site plans
- CQ Site Drainage System Plans
- British Geological Survey Maps
- WS Atkins Environment: Project Bear – Site Investigation and Assessment Power Station “Cockerel”, Report, dated July 2000 (WS Atkins 2000);
- E.ON UK Plc. – Connah’s Quay Power Station Site Report for PPC Application Ref: MP3337SH – October 2005 (E.ON 2005);
- E.ON UK Plc – Connah’s Quay Power Station PPC Permit Number MP3337SH – Improvement Condition (IC2): A Review of Site Drainage, undated (E.ON Drainage Review), no date provided;
- Connah’s Quay Power Station Monitoring of Repairs to Hydrochloric Acid Tank bund. Dated November 2013 (E.ON 2013)
- E.ON New Build & Technology – Connah’s Quay Power Station Inspection of Secondary Containment, Job No. 2122.C30980.001, dated March 2014 (E.ON 2014-1);
- E.ON UK Plc. – A Site Protection and Monitoring Programme for E.ON UK – Connah’s Quay Power Station, Permit Ref. MP3337SH – April 2014, version 6 (E.ON 2014-2); and
- E.ON UK Plc – Index for Tank Drawing MOD, dated June 2014 (E.ON 2014-3).

Summary of Previous Reports for Permitted Site Area

Zone	Report Title	Date	Scope of Work	Contamination identified/Key Issues Identified
Z1-4	Site Investigation Logs (Boreholes BH2 to BH5), Soil Mechanics 1991 Groundwater Level Monitoring Results, 1997-2005 Groundwater sampling and analysis data, Parsons Brinckerhoff, 2005	1999 to 2005	Not Specified	Summarised with the Site Report prepared for an IPPC Permit. Pertinent section on groundwater levels, geology and hydrogeology are presented in Section 3.
Z2 & 3	WS Atkins Environment Project Bear – Site Investigation and Assessment Power Station “Cockerel”, Report, dated July 2000 (WS Atkins 2000)	2000	Intrusive investigation by W S Atkins to assess the ground conditions based on previously identified uncertainties about the quality and type of fill material used prior to construction of the Connah’s Quay Power Station. Included 6 no. window sample probe holes (CQ1-6), 4 groundwater samples from existing 4 boreholes (BH2-5) installed in 1991 by Soil Mechanics. Samples were collected for chemical analysis.	Site raised approx. 2m by FBA and PFA from the former Power Station which was deposited in alluvium bunded lagoons. Elevated levels (at the time of reporting) were: arsenic at CQ3, CQ4, CQ5 and CQ6; nickel at CQ5 and CQ6; boron at CQ3; and sulphate at CQ4 and CQ6 soil sample locations and sulphate noted in BH2W and BH5W and arsenic in BH2W groundwater sample locations. The report concluded that the site would unlikely to be classified as ‘contaminated land’ under Part IIA of the Environmental Protection Act (1990) and that Made Ground underlying the site presented a low risk to the environment.
Z1-3	E.ON UK Plc Connah’s Quay Power Station Site Report for PPC Application Ref: MP3337SH – October 2005 (E.ON 2005)	2005	Assessment of the condition of the site and to identify any substance in, on or under the land that may constitute a pollution risk to the land. Prepared as part of an application to the EA for a permit to operate an installation under Regulation 10 of the PPC Regulations 2000.	The report concludes that significant pre-existing contamination underlying the current power station site is considered unlikely, owing to the presence of PFA at depth. However, 9 reportable incidents of land contamination have been reported to the EA, in addition to two losses of contaminants within stock control and 7 incidents of loss of containment or loss to land. The report summarises local ground conditions, results of previous investigations, sources of potential contaminants and identifies nearby receptors (e.g. shallow groundwater in the Alluvium Aquifer as a potential conduit for migration of contaminants to the salt marshes and river).

Z1-3	E.ON UK Plc Connah's Quay Power Station PPC Permit Number MP3337SH – Improvement Condition (IC2): A Review of Site Drainage, undated (E.ON Drainage Review), no date provided.	No Date	To review the drainage on site and identify all emission points to water.	All site installation water emissions were reviewed and identified. Discharge points W1 and W2 are the only emission points. The potential risks of releases of oils and chemicals to controlled waters via W1-2 were assessed as 'Low'. No other emission points were found.
	E.ON UK Plc A Site Protection and Monitoring Programme for E.ON UK – Connah's Quay Power Station, Permit Ref. MP3337SH – April 2014, version 6 (E.ON 2014-2)	2014	Updated version of the original SPMP sent to the Environment Agency as part of the original IPPC permit application. Report details the effectiveness of infrastructure and procedures to provide a warning of loss of containment and to assist in permit surrender, to confirm no deterioration of land whilst under permit	Marginally elevated concentrations of arsenic and molybdenum have been detected in groundwater under the permitted installation site, thought to be attributable to the presence of historical PFA deposits. Report concludes that the PFA is unlikely to be a significant source of environmental risk and that there is no need for further site investigation or additional gathering of reference data

APPENDIX C

CQ Potential Contaminants Assessment Table

APPENDIX D

Photographs of Hydrochloric Acid Bund Damage and Repair



Plan view of south west corner of bund and blind sump



Damage to the outside of the bund



Coating to repaired area of tank plinth



Sump pit with chamfered corners after coating

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SOFTWARE	None
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