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Redcar Energy Centre



Redcar Holdings Limited

Site Condition Report

Document approval

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Contents

1	Introduction.....	4
1.1	The objective.....	4
2	Site details.....	5
2.1	Site address.....	5
3	Condition of land at permit issue.....	6
3.1	Geology, Hydrogeology & Hydrology.....	6
3.1.1	Geology.....	6
3.1.2	Hydrogeology.....	6
3.1.3	Hydrology and surface waters.....	7
3.2	Pollution History.....	8
3.2.1	Historical land use within the Installation Boundary.....	8
3.2.2	Historical incidents.....	8
3.2.3	Historical pollution potential.....	8
3.2.4	Current pollution potential.....	9
3.2.5	Permits & consents.....	9
3.2.6	Groundwater abstractions.....	10
3.2.7	Potable water abstractions.....	10
3.2.8	Surface water abstractions and discharges.....	10
3.2.9	Landfill and waste sites.....	10
3.2.10	COMAH sites.....	11
4	Permitted Activities.....	12
4.1	Activities.....	12
4.2	On-site fuel and chemical storage facilities.....	13
4.3	Environmental Risk Assessment.....	17
5	EC Guidance: Stage 1 – 3 Assessment.....	18
6	Previous Contamination & Site Investigations.....	23
6.1	Site investigations.....	23
7	Ongoing Management.....	24
8	Conclusions.....	25
	Appendices.....	26
A	Redcar Energy Centre Environmental Statement Chapter 9: Geology, Hydrology and Contamination, RPS, July 2020.....	27
B	Redcar Energy Centre Environmental Statement Appendix 9; Phase 1 Preliminary Risk Assessment.....	28
C	Redcar Energy Centre Appendix 13.1: Archaeological Desk Based Assessment, RPS, July 2020.....	29

1 Introduction

Redcar Holdings Limited (Redcar Ltd) is developing the Redcar Energy Centre (REC) which will comprise the following waste treatment activities:

1. a fuel preparation facility;
2. Energy Recovery Facility (ERF) to incinerate incoming non-hazardous waste, and
3. an IBA treatment/processing facility (IBA facility).

A detailed description of REC is presented within section 1 of the Supporting Information.

Redcar Ltd is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPR) for an Environmental Permit (EP) to operate REC. As part of the EP application, a Site Condition Report is required to be developed and submitted to the EA.

1.1 The objective

The purpose of the Site Condition Report is to summarise the existing ground conditions for the land within the Installation Boundary (the 'Site') and describe the setting for REC at the time of applying for the EP. This report draws on the following sources of background information which are provided as Appendices:

- Redcar Energy Centre Environmental Statement Chapter 9: Geology, Hydrology and Contamination, RPS, July 2020 (Appendix A);
- Redcar Energy Centre Environmental Statement Appendix 9; Phase 1 Preliminary Risk Assessment (Appendix B); and
- Redcar Energy Centre Appendix 13.1: Archaeological Desk Based Assessment, RPS, July 2020 (Appendix C).

Annex E of Appendix B also includes a Groundsure Report which has been referenced throughout this report.

This report presents background information on the existing ground conditions in relation to the following:

1. Geology;
2. Hydrogeology;
3. Hydrology and surface waters; and
4. Historical and present land use.

The report:

1. Considers the proposed activities to be carried out at the site;
2. Identifies any land contamination risks the activities pose that may be linked to previous pollution events; and
3. Identifies how a baseline for the existing ground conditions will be established.

Plans and drawings for REC can be found in Appendix A of the supporting information for the EP Application. These include the following:

1. Site location plan;
2. Installation boundary;
3. Emission points drawing; and
4. Process schematics.

2 Site details

REC will be located on approximately 10 hectares of land at the Redcar Bulk Terminal, approximately 4.5 km west of Redcar town centre and 8.5km northeast of Middlesbrough city centre. REC will be located at an approximate National Grid Reference of NZ 55890 26032, with the nearest postcode listed as TS10 5QW.

The Site was previously heavily industrialised as it formed part of the former Teesside Steel Works (the Steel Works). The Redcar Bulk Terminal was used for the shipment of coal, coke and other bulk goods, and for importing iron ore.

The eastern boundary of the site is formed by coke ovens associated with the Steel Works, with a further area of the Steel Works located to the southeast of the site. The north and northeast boundaries of the site are formed of a high earth bund, beyond which lies an area of sand dunes which are part of the Bran Sands. The western boundary of the site is not enclosed or marked but a further storage area of the Redcar Bulk Terminal and the Tees Estuary lies beyond it.

Access to REC will be via a series of internal access roads which serve the industrial area, with a link to the A1085 which provides a strategic access to Middlesbrough and beyond via the A19.

A site location plan and Installation Boundary drawing are presented in Appendix A of the Supporting Information.

2.1 Site address

Redcar Energy Centre,
Land at Redcar Bulk Terminal,
Redcar,
TS10 5QW

3 Condition of land at permit issue

3.1 Geology, Hydrogeology & Hydrology

3.1.1 Geology

The geology associated with the Site has been assessed in Appendices A, B and C and is summarised within Table 1. Historically, the site formed part of an extensive area of estuarine and coastal mudflats at the mouth of the River Tees. However, from the mid-19th Century onwards, the topography of the Site and surrounding area has been significantly altered through repeated land reclamation and industrial development, which has raised ground levels.

Table 1: Site lithology and description

Lithology	Description
Artificial Ground	Associated with reclamation of the site. Suggested that steelworks waste has been used for reclamation, which is likely to consist of slag and other foundry waste material. Approximate depth of 5 m (assumed). No aquifer.
Tidal Flat Deposits	Sand and silt. Approximate depth of up to 12 m (assumed). Secondary Undifferentiated Aquifer.
Mercia Mudstone Group	Dominantly red, occasionally green-grey mudstone and siltstone. Considerable depth assumed (1 km). Secondary B aquifer.

The BGS Historic Borehole index indicates that there are no recorded boreholes within the within the installation boundary. However, two boreholes within 250 m of the application site confirm the above information.

3.1.2 Hydrogeology

The underlying hydrogeology to the Site can be summarised as follows:

- The Tidal Flat Deposits are classified by the EA as a Secondary Undifferentiated Aquifer. These aquifer units have variable characteristics, so it is not possible to attribute them to Secondary A or Secondary B categories.
- The underlying Mercia Mudstone Group is classified as a Secondary B Aquifer. These formations are generally formed of lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

There are no records of active licensed groundwater abstractions within 2 km of the installation boundary. Furthermore, the Site is not located in a Groundwater Source Protection Zone (SPZ).

In accordance with the Water Framework Directive, the groundwater chemical quality within the installation boundary was classified as 'Poor' quality in 2015 in the EA's local River Basin Management Plan.

3.1.3 Hydrology and surface waters

It is reported in the Groundsure report that there are no Water Network records (rivers, streams, lakes and canals) or surface water features (Rivers, streams, lakes, ponds) recorded within 250 m of the installation boundary. There is one Water Framework Directive (WFD) (for the protection of inland surface waters, estuaries, coastal waters and groundwater) surface water catchment feature, one surface water body feature and one groundwater body feature within 250 m of the installation boundary.

Table 2: WFD features within 250 m of REC

Type	Location	Details
Surface water body catchment	On-site	Type: Coastal catchment (not part of a river WB catchment) Water Body ID: 10 Operational catchment: Tees Lower and Estuary Management catchment: Tees
Surface water body	4 m N	Name: Tees Type: Transitional Water body ID: GB510302509900 Overall rating: Moderate Chemical rating: Fail Ecological rating: Moderate Year: 2016
Groundwater body	On-site	Name: Tees Mercia Mudstone & Redcar Mudstone Water body ID: GB40302G701300 Overall rating: Poor Chemical rating: Poor Quantitative: Good Year: 2015

The Groundsure report states that there is no risk of flooding from rivers and seas within 50 m of the installation boundary. The nearest area at risk of coastal flooding is ~125 m from the installation boundary. There is one record of historical flooding events within 250 m of the installation, which was a Tidal flood occurring between 5 and 6 December 2013. The tidal flood occurred 71m NW of the installation and was caused by an operational failure/breach of defence. There are no records of flood defences or flood storage areas and no areas which would benefit from the presence of flood defenced within 250m of the installation.

The site lies within EA Flood Zone 1, which has a <0.1% annual probability of river or sea flooding. As stated in the Groundsure report, the maximum risk of surface water flooding from pluvial events on site is a 1 in 100 year 0.3m to 1m flood. The maximum risk within 50 m of the Site is a 1 in 30 year 0.3m to 1m flood.

3.2 Pollution History

3.2.1 Historical land use within the Installation Boundary

A review of the historical use of the Site was undertaken by RPS in 2020, as detailed in Appendix B. These reviews considered land use back to 1893.

From 1893 through to 1969, the land was an area of foreshore between the high and low tidal limits, with Redcar Jetty and associated Tramway crossing the south of the Site. From 1952, extension of the Tramway across the centre of the Site on raised land, named Spoil heap, suggests earthworks. From 1980 to present, the southern eastern area of the Site has long rectangular structures, and there is an access roadway at the southern boundary, both presumed to be associated with the adjacent Steelworks. Between 1980 and 1991 there was a presence of conveyors, roadways and auxiliary buildings, and the Site is labelled as Teesside Works Redcar. It is thought that in 1999, the Site was used for the surface storage of material associated with the Steelworks. More recent aerial photographs indicate that the majority of the Site was vacant, apart from the compound area containing small buildings, skips, containers and possible areas of stockpiled materials and/or waste.

3.2.2 Historical incidents

EA data from the Groundsure report indicates that there are no records of 'major' or 'significant' pollution incidents within 500 m of the Site. On 6 December 2002 a '*minor land impact*' was recorded 173 m from the installation from general biodegradable materials and wastes.

3.2.3 Historical pollution potential

Table 3: Summary of all historical pollution potential sources

Location	Source	Description
On-site	Historical tramway	Potential for hydrocarbons, metals, inorganic compounds, acids, alkalis, organic solvents, PCB's and asbestos.
On-site	Tipping of materials	Potential for hydrocarbons, metals, inorganic compounds, acids, alkalis, organic solvents, PCB's and asbestos.
On-site	Conveyors, buildings and roadways associated with the wider steel works.	Potential for hydrocarbons, metals, inorganic compounds, acids, alkalis, organic solvents, PCB's and asbestos.
Off-site	Spoil tipping associated with steel works and industrial use	Potential for a wide range of contaminants to be present in soil and groundwater.
Off-site	Storage of process materials associated with steel works and industrial use	Potential for a wide range of contaminants to be present in soil and groundwater.
Off-site	Railways and roadways associated with steel works and industrial use	Potential for a wide range of contaminants to be present in soil and groundwater.

3.2.4 Current pollution potential

Table 4: Summary of all current pollution potential sources

Location	Source	Description
On-site	Sheds, cabins, containers, skip and vehicle storage associated with steel works	Potential for a wide range of contaminants to be present in soil and groundwater.
On-site	Pipelines, drainage infrastructure and other relict infrastructure associated with steelworks and other industrial land uses.	Potential for a wide range of contaminants to be present in soil and groundwater.
On-site	Made ground likely to be present to a considerable depth beneath the Site.	Potential for a wide range of contaminants to be present in soil and groundwater.
Off-site	Adjacent steelworks featuring tanks, pipelines, conveyors.	Potential for a wide range of contaminants including hydrocarbons, metals, inorganic compounds acids, alkalis, organic solvents, PCBs and asbestos.

3.2.5 Permits & consents

Table 5: Environmental Permits within 500 m of the Site

Distance from the Site (m)	Direction from the Site	Details
390	E	EPR Reference: RP3793NV/A001 EPR Licence: BRI002 Operator: British Steel Corporation. Process type: Industrial waste Landfill 25,000 tonnes. Status: Expired 01/04/1996
409	SE	Teesside Beam Mill EPR reference: VP3839DA Permit reference: QP3735JT Operator: British Steel Limited Process type: Associated processes. Status: Effective
449	W	EPR licence: BRI001VP3839DA EPR reference: TP3390ZV/S002 Operator: Corus Construction Process type: Industrial waste Landfill 25,000 tonnes. Status: Surrendered 29/11/2018

3.2.6 Groundwater abstractions

As reported in the Groundsure Report, there are no licenced ground water abstractions recorded within 2km of the Site.

3.2.7 Potable water abstractions

As reported in the Groundsure Report, there are no licensed potable water abstractions within 2km of the Site.

3.2.8 Surface water abstractions and discharges

As reported in the Groundsure Report in Annex E of Appendix B, there are two historical surface water abstractions within 2km of the Site. However, there are no records of active licensed surface water abstractions within 2km of the Site.

3.2.9 Landfill and waste sites

According to the Groundsure report in Annex E of Appendix B, there is one recorded authorised or historical landfill site and one historical waste site within 250m of the Site.

Table 6: Historical Licenced waste management facilities within 500 m of the Site

Site	Location	Details
Landfill site, Warrenby, on land adjacent to Redcar Blast Furnace, Redcar, Cleveland.	433m E	Operator: British Steel PLC. EPR reference: YP1/L/BRI012 Status: Surrendered 13/04/1997
Ground workings and refuse heap	287 m NE	No details. 1929.

According to the Groundsure report in Annex E of Appendix B, there are three currently licenced waste management facilities within 500m of the Site. The details of these are provided below:

Table 7: Licenced waste management facilities within 500m of the Site

Site	Location	Details
Blast Furnace Plant	390 m E	Industrial Waste Landfill. EPR licence number: BRI002 Operator: British Steel Corporation Waste management licence number 68638. Status: Expired
Blast Furnace Plant	390 m E	Industrial Waste Landfill 25,000 tonnes. EPR licence number: BRI002 EPR reference: EA/EPR/RP3793NV/A001 Operator: British Steel Corporation Waste management licence number 68638. Status: Expired
B S Redcar Works	449 m W	Industrial Waste Landfill 25,000 tonnes.

Site	Location	Details
		EPR licence number: BRI001 EPR reference: EA/EPR/TP3390ZV/S002 Operator: Corus Construction & Industrial (British Steel Plc) Waste management licence number: 60141. Status: Surrender

3.2.10 COMAH sites

As reported in the Groundsure Report, there are three Control of Major Accident Hazards (COMAH) sites within 500m of the installation. The details of these are provided in Table 8.

Table 8: COMAH sites within 500m of the Site

Company	Operational Status	Tier
British Steel Corporation Ltd	Historical NIHHS Site	-
Sahaviriya Steel Industries UK Limited	Historical COMAH Site	COMAH Upper Tier Operator
South Tees Site Company Limited	Current COMAH Site	COMAH Upper Tier Operator

4 Permitted Activities

4.1 Activities

The permitted activities will consist of a combination of Schedule 1 installation activities (as defined in the Environmental Permitting Regulations) and directly associated activities:

Table 9: Scheduled and Directly Associated Activities

Type of Activity	Schedule 1 Activity	Description of Activity
Installation (ERF)	Section 5.1 Part A(1) (b)	Line 1 – The incineration of non-hazardous waste in a waste incineration plant with a capacity of 3 tonnes per hour or more
Installation (ERF)	Section 5.1 Part A(1) (b)	Line 2 – The incineration of non-hazardous waste in a waste incineration plant with a capacity of 3 tonnes per hour or more
Installation (fuel preparation facility)	Section 5.4 Part A(1) (b) (ii)	<p>D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12</p> <p>R1: Use principally as a fuel or other means to generate energy</p> <p>R3: Recycling/reclamation of organic substances which are not used as solvents</p> <p>R4: Recycling/reclamation of metals and metal compounds</p> <p>R5: Recycling/reclamation of other inorganic materials</p>
Installation (IBA)	Section 5.4 Part A(1) (b) (iii)	<p>D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12</p> <p>R5: Recycling/reclamation of other inorganic materials</p> <p>R4: Recycling/reclamation of metals and metal compounds</p>
Directly Associated Activities		
Directly Associated Activities		Energy generation
Directly Associated Activities		A medium combustion plant comprising a diesel generator
Directly Associated Activities		Surface water management
Directly Associated Activities		<p>R13: Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)</p> <p>D15: Storage pending any of the operations numbered D1 to D14 (excluding</p>

Type of Activity	Schedule 1 Activity	Description of Activity
		temporary storage, pending collection, on the site where it is produced)
Directly Associated Activities		<p>R13: Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)</p> <p>D15: Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where it is produced)</p>

4.2 On-site fuel and chemical storage facilities

As identified in the Supporting Information document, the activities undertaken at REC will utilise a number of fuels and chemicals. These materials will be stored in accordance with current guidance.

The delivery and transfer details, and secondary and tertiary containment systems associated with the storage of these materials are presented in Table 10.

Table 10: Chemical and Fuel Containment Facilities

Material	Delivery details	Transfer for storage details	Storage containment details
Primary raw materials			
Low sulphur fuel oil	Delivered using tanker.	Unloading from delivery vehicle tanker into storage tank using sealed pipework. Storage tanks located with a dedicated concrete sump or other bunding. Hardstanding in this area will also have links to process drainage system.	Primary: Tank Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Ammonia solution	Delivered using tanker.	Unloading from sealed delivery vehicle into storage tank via standard hose connection, under supervision by trained site operatives. Storage tanks and unloading located in a covered area with a dedicated concrete sump or other bunding. Hardstanding in this area will have	Primary: Tank Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage

Material	Delivery details	Transfer for storage details	Storage containment details
		contained drainage. Tanks to have high tank level alarms or trips.	
Lime	Delivered using tanker.	Pneumatic unloading from delivery vehicle into storage silo. Exhaust air to be dedusted using fabric filters and automatic cleaning with compressed air after filling. Filter to be regularly inspected for leaks. Silos to be fitted with a high level alarm system to prevent overfilling.	Primary: Silo Secondary: Hardstanding Tertiary: Contained process drainage
Activated carbon	Delivered using tanker.	Pneumatic unloading from delivery vehicle into storage silo. Exhaust air to be dedusted using fabric filters and automatic cleaning with compressed air after filling. Filter to be regularly inspected for leaks. Silos to be fitted with a high level alarm system to prevent overfilling.	Primary: Silo Secondary: Hardstanding Tertiary: Contained drainage
Water treatment chemicals¹			
Sodium hydroxide	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: IBC Secondary: Hardstanding Tertiary: Contained drainage
Sulphuric acid	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage

Material	Delivery details	Transfer for storage details	Storage containment details
Hydrochloric acid	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Sodium chloride	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package or bag Secondary: Hardstanding Tertiary: Contained drainage
Oxygen scavenger (Boilex 510A or equal)	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package Secondary: Hardstanding Tertiary: Contained drainage
Sodium phosphate	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package Secondary: Hardstanding Tertiary: Contained drainage
Ammonium Hydroxide	Delivered by HGV or other large vehicle.	Consumer package or bag assumed to be delivered on a pallet or similar. Will be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Consumer package Secondary: Hardstanding Tertiary: Contained drainage
Other raw materials¹			
Hydrated lime	Delivered using tanker.	Pneumatic unloading into silo, dusts abated using fabric filers, high level alarm to prevent overfilling, areas for delivery/transfer will	Primary: Silo Secondary: Hardstanding Tertiary: Contained process drainage

Material	Delivery details	Transfer for storage details	Storage containment details
		have links to process drainage system.	
Lubrication and hydraulic oil	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: Barrels or IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Lubrication greases	Delivered by HGV or other large vehicle.	Consumer package or barrels assumed to be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Barrels or consumer package Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Washing Solvent	Delivered by HGV or other large vehicle.	Consumer package or barrels assumed to be unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: Barrels or consumer package Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Ethylene or propylene glycol	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area. Storage area will have bunding to 110% of the capacity of the IBC.	Primary: Barrels or IBC Secondary: Bunding (110%) Tertiary: Hardstanding and contained drainage
Propane	Delivered by HGV or other large vehicle.	Unloaded using suitable mobile plant and transferred to dedicated storage area.	Primary: Bottles Secondary: Hardstanding Tertiary: Contained drainage
Calibration gases / liquids	Delivered by HGV or other large vehicle.	Unloaded using suitable mobile plant and transferred to dedicated storage area.	Primary: Bottles Secondary: Hardstanding Tertiary: Contained drainage
Fire extinguisher foam	Delivered by HGV or other large vehicle.	IBC's unloaded using forklift or similar mobile plant and transferred to dedicated storage area.	Primary: IBC Secondary: Hardstanding Tertiary: Contained drainage

Material	Delivery details	Transfer for storage details	Storage containment details
¹ These are examples of typical chemicals (including delivery/storage details) used at similar waste incineration facilities to the ERF at REC. Details specific to REC may be subject to final design.			

Various maintenance materials (oils, greases, insulants, antifreezes, welding and firefighting gases etc.) will be stored in an appropriate manner. Any gas bottles on-site will be kept secure in dedicated area(s).

4.3 Environmental Risk Assessment

An Environmental Risk Assessment has been carried out following the Environment Agency Horizontal Guidance Note H1. This is included within Appendix D of the Supporting Information. The assessment considers all potential sources of ground and surface water pollution that could occur due to fugitive emissions from REC or from accidents occurring at REC. The risk assessment also details any mitigation measures that will be employed to reduce the frequency or impact of these events.

The Environmental Risk Assessment identifies that the operation of REC will require the storage of various chemicals, which could pose a risk to the ground and groundwater during normal operation. All process areas, loading/unloading areas, materials handling areas and roadways will be covered in concrete and/or tarmac hardstanding. As such, it is regarded that there will be little risk of ground/groundwater contamination during normal operation of REC.

Therefore, it is concluded that REC will pose little risk of pollution. However, periodic soil and groundwater samples at the Site will be undertaken to fulfil the requirements of Articles 14(1)(b), 14(1)(e) and 16(2) of the Industrial Emissions Directive (IED).

5 EC Guidance: Stage 1 – 3 Assessment

In accordance with European Commission Guidance concerning baseline reports under Article 22(2) of the IED, a Stage 1 – 3 assessment has been undertaken to identify hazardous substances used at REC.

Stages 1 – 3 of the assessment are described as follows:

1. Identify which hazardous substances are used, produced or released at the installation.
2. Identify which of these substances are classed as ‘relevant hazardous substances’ (defined within Article 3 of EC Regulation 1272/2008). Justify any hazardous substances which have been excluded due to their incapability to contaminate soil or groundwater.
3. For each relevant hazardous substance, identify the actual possibility for soil or groundwater contamination at the Site (including probability of release), taking into account quantities, storage and transport, risk of release.

The full stage 1 – 3 assessment of the primary raw materials and residues handled at REC is presented in Table 11. The substances handled at REC are identified in the context of their hazards and theoretical pollution risk, with justification as to whether the substance is of concern or not in the context of the Site.

Table 11: Stage 1 – 3 assessment of raw materials and residues at REC

Stage 1: Chemicals handled	Stage 2: Chemical characteristics and toxicity							Stage 3: Site specific characteristics			Stage 4: Site specific risk
Substance	Concentration / State	CAS No.	EC/List No.	Hazard statements (CLP)	Hazard substance under Stage 2?	Environmental fate / behaviour	Potential Pollution Risk?	Approx. Quantity Stored	Storage Arrangements/ Containment	Delivery, Storage and use details	Comments/ Chemical of concern?
Fuel preparation facility – Raw materials											
Non-hazardous waste	S (possibly some liquids)	N/A	N/A	N/A	No	Mostly insoluble, however potential for a wide range of contaminants and potential for liquids to be present.	Yes	TBC upon completion of detailed design.	The fuel preparation facility will consist of a number of waste storage bays constructed of reinforced concrete. They will have sufficient holding capacity for effective buffering between deliveries and processing rates. There will be an exterior location for baled waste.	Waste will be delivered to REC via road. Waste will be unloaded into the enclosed waste reception and storage area.	Waste unloading and storage activities will be undertaken on areas of hardstanding. Periodic inspections of waste levels against maximum capacity will be undertaken. Any spillages will be cleaned up.
ERF – Raw materials											
Non-hazardous waste	S (possibly some liquids)	N/A	N/A	N/A	No	Mostly insoluble, however potential for a wide range of contaminants and potential for liquids to be present.	Yes	18,000 m ³ (approx. 6,300 tonnes or 5 days processing capacity)	The ERF bunker, constructed of reinforced concrete.	Waste will be delivered in enclosed waste delivery vehicles from the fuel preparation facility and off-site sources into the ERF enclosed waste reception and bunker.	Waste unloading and storage activities will be undertaken on areas of hardstanding. Periodic inspections of waste levels against maximum capacity will be undertaken. Any spillages will be cleaned up. Regular preventive maintenance of the bunker.
Fuel Oil (saturated and aromatic hydrocarbons)	Liquid	68334-30-5	269-822-7	H226, H304, H373, H315, H332, H351, H411, H350	Yes	Insoluble, high toxic effects, volatile	Yes	170 m ³	Enclosed tank with bunding	Delivery to REC in dedicated road tankers, unloaded into storage tank via flexible hose, direct feed into burners.	Periodic inspections of tank undertaken (preventative maintenance), refuelling undertaken on areas of hardstanding with contained drainage, overflow protection on tank.
Ammonium hydroxide solution, NH ₄ OH	25% NH ₃ , Liquid	1336-21-6	215-647-6	H314, H335, H400	Yes	Water soluble Potential for mobility in soil and water systems	Yes	84 m ³	Enclosed tank, double skinned, bunding	Delivered by road tanker and pumped into storage tank via flexible hose, direct feed from tank into the process	Unloading operations on areas of hardstanding with contained drainage, storage in a bunded area, site drainage will be able to be isolated in a spill event, air emissions system is subject to advanced control measures

Stage 1: Chemicals handled	Stage 2: Chemical characteristics and toxicity							Stage 3: Site specific characteristics			Stage 4: Site specific risk
Substance	Concentration / State	CAS No.	EC/List No.	Hazard statements (CLP)	Hazard substance under Stage 2?	Environmental fate / behaviour	Potential Pollution Risk?	Approx. Quantity Stored	Storage Arrangements/ Containment	Delivery, Storage and use details	Comments/ Chemical of concern?
Lime, Ca(OH) ₂	100%, Solid	1305-62-0	215-137-3	H315, H318, H335	Yes	High aqueous solubility	Yes	468 m ³	Enclosed silo(s)	Delivered in tankers, unloaded into storage silo by flexible hose, direct feed into flue gas treatment systems, collected on bag filters.	Any spillages easily swept up, site containment and handling procedures are good. Chemical dosing rates and flows within the FGT process are subject to control systems. Storage silos will be located above concrete hardstanding, and fitted with high-level alarms for unloading operations. Drainage in these areas will be contained.
Powder Activated Carbon, C	100%, Solid	7440-44-0	231-153-3	H252	Yes	Insoluble	No	75 m ³	Enclosed silo	Delivered by road, unloaded into silo via flexible hose. Direct feed into flue gas treatment system.	Any spillages easily swept up, site containment and handling procedures are good. Silo located above an area of concrete hardstanding.
Boiler Treatment Chemicals (salts, oxygen scavenger, corrosion inhibitor)	Liquid and solids	Various	Various	Dependent on chemicals used (subject to detailed design)	Yes	Potential for mobility in soil and water systems, potential for toxicity	Yes	N/A – various storage facilities	IBCs for liquids, with bunding where appropriate. Consumer package or bags for solids	Boiler treatment chemicals will be stored in a designated area in/near the water treatment plant.	Spillages will be contained by hardstanding and contained drainage.
ERF - Residues											
APCr (contains heavy metals, POPs)	Solid	90989-48-3	292-705-7	N/A	Yes	Presence of persistent organic pollutants (e.g. dioxins), volatiles.	Yes	702 m ³	2 x APCr silo	Collection on bag filters, direct feed from flue gas treatment system into residue silo, then loaded into tanker (all enclosed) for transfer to hazardous landfill disposal.	Any leaks during loading/unloading operations will be contained by concrete hardstanding, with measures to prevent overflowing in place. APCr storage and unloading will be in areas with contained drainage to the process drainage network.

Stage 1: Chemicals handled	Stage 2: Chemical characteristics and toxicity							Stage 3: Site specific characteristics			Stage 4: Site specific risk
Substance	Concentration / State	CAS No.	EC/List No.	Hazard statements (CLP)	Hazard substance under Stage 2?	Environmental fate / behaviour	Potential Pollution Risk?	Approx. Quantity Stored	Storage Arrangements/ Containment	Delivery, Storage and use details	Comments/ Chemical of concern?
IBA facility – Incoming materials											
Incinerator Bottom Ash (IBA)	Solid	91082-83-6	293-798-7	N/A	No	Limited solubility, potential for the presence of heavy metals	No	40,000 tonnes	Reception bunker in enclosed building.	Transferred from the ERF to the adjacent IBA facility via conveyor. Some external IBA will be imported to site using road vehicles. Stored within an enclosed reception bunker before being transferred to process building for processing.	Inert and non-hazardous. Transfer to IBA facility will be via an enclosed conveyor. Storage in an enclosed reception bunker.
Aggregates for blending	Solid	N/A	N/A	N/A	No	Limited solubility, potential for the presence of heavy metals	No	5,000 tonnes	External stockpiles in storage yard.	Delivered to site in road vehicles.	Stored on hardstanding with contained drainage.
IBA – Residues											
Unburnt, oversized or unsuitable materials	S	N/A	N/A	N/A	No	Limited solubility, potential for the presence of heavy metals	No	N/A	For unacceptable wastes which cannot be re-combusted in the ERF there will be a quarantine area prior to the waste being removed to a suitably licensed facility within 7 days.	Stored in quarantine area and removed from site in a timely manner.	Impermeable hardstanding with contained drainage.
Processed IBAA	S	N/A	N/A	N/A	No	Limited solubility, potential for the presence of heavy metals	No	20,000 tonnes	External stockpiles in storage yard. Runoff from washdown and process areas to be collected in sealed drainage system and reused onsite in ash processing. Any excess water would be directed to the ERF wastewater pit.	Processed IBA moved from process building to stockpiles via front-end bucket, for maturation storage period. IBAA leaving the site to be removed from REC via enclosed/sheeted vehicles.	IBA handling will be undertaken on areas of hardstanding with contained drainage. Transfer off-site will be in enclosed/covered vehicles.

Stage 1: Chemicals handled	Stage 2: Chemical characteristics and toxicity							Stage 3: Site specific characteristics			Stage 4: Site specific risk
Substance	Concentration / State	CAS No.	EC/List No.	Hazard statements (CLP)	Hazard substance under Stage 2?	Environmental fate / behaviour	Potential Pollution Risk?	Approx. Quantity Stored	Storage Arrangements/ Containment	Delivery, Storage and use details	Comments/ Chemical of concern?
Extracted metals	S	N/A	N/A	N/A	No	Limited solubility, potential for the presence of heavy metals	No	1,000 tonnes	Containers in storage yard.	Removal via vehicles for recycling.	Storage in metal containers and prompt removal from site. Site process areas fitted with hardstanding and contained drainage.

6 Previous Contamination & Site Investigations

6.1 Site investigations

As stated within Article 22 (2) of the EA Industrial Emissions Directive (IED):

“Where the activity involves the use, production or release of relevant hazardous substances [RHS] and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation or before a permit for an installation is updated for the first time after 7 January 2013”.

Furthermore, the EA guidance note ‘H5: Site Condition Report – Guidance and Templates’ states that “where a facility involves the use, production or release of RHS”, a baseline report must be submitted as part of the application.

At the time of writing this report, there have not been any intrusive investigations undertaken at the Site. The conclusions and recommendations of the Phase 1 Preliminary Risk Assessment (Appendix B) are that a Phase 2 Geo-Environmental Site Investigation is undertaken, to assess the potential for active pollutant linkages. This is reflected within the planning decision notice (specifically, Condition 3), which requires further characterisation and assessment of the site to be undertaken, and remediation to be implemented if required. At the time of writing, we are not aware of any further assessments being submitted to the local planning authority to discharge Condition 3. As such, Fichtner does not have access to any further intrusive investigation results, so it is not possible to provide baseline reference data at this stage.

Data obtained on the ground conditions at the Site, either prior to commencement of construction, or through the construction phase of REC, will be collated within this Site Condition Report. This Site Condition Report will be updated following completion of any additional site investigations and will be maintained throughout the lifetime of REC.

7 Ongoing Management

During the lifetime of the permit, the Site Condition Report will be updated to take into account the following:

- any changes to the permitted activities or the Installation Boundary;
- any measures taken to protect the underlying land and groundwater;
- any pollution incidents that may have had an impact on land and associated remediation; and
- any soil, gas or groundwater monitoring (where undertaken).

At the end of the operational life of REC, the Site Condition Report will be updated to include for decommissioning and site closure. It will be demonstrated that all sources of pollution risk have been removed and whether decommissioning has had any impact on the land. Any required remedial works will be documented and incorporated into the report. A statement of site condition will be made to confirm that:

- the permitted activities have stopped;
- decommissioning is complete, and the pollution risk has been removed; and
- the land is in a satisfactory condition.

8 Conclusions

This report has identified the historical and current condition of land, the activities to be permitted at the Site and detail on the reagents and residues to be involved with the development. At the time of writing, only a Phase 1 site investigation has been undertaken, and the planning consent requires that an investigation is undertaken to assess the potential for active pollutant linkages within the installation. This will require that intrusive site investigations are undertaken. The Site Condition Report will be updated following completion of these works (i.e. prior to commencement of construction), as well as following any remediation or additional site investigations undertaken throughout the lifetime of REC.

During the Operational phase of REC, any records which demonstrate how the land and groundwater have been protected will be maintained. This information will include inspection records of site infrastructure, pollution/incident reports, records of any ground investigations undertaken, and any monitoring records of soil, gas and/or water during the life of the permit. Where it is identified that pollution has occurred records will be maintained to demonstrate any pollution incidents that may have affected the land or groundwater. These records will be retained to be used at Permit Surrender.

Appendices

A Redcar Energy Centre Environmental Statement Chapter 9: Geology, Hydrology and Contamination, RPS, July 2020

B Redcar Energy Centre Environmental Statement Appendix 9; Phase 1 Preliminary Risk Assessment

C Redcar Energy Centre Appendix 13.1: Archaeological Desk Based Assessment, RPS, July 2020

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