

Acciona Industrial

NESS Energy from Waste Facility

Pollution Prevention and Control -
Addendum Site Condition and
Baseline Report

SCR002

Issue 2 | 15 June 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Appendices

Appendix A

Updated Table 3.1

1 Introduction

SEPA have reviewed the Site Condition and Baseline Report issued in August 2019 and have requested further information in relation to the following points:

Information Notice Question Reference	Issue to be addressed	Addressed in section
5	Provide a revised statement of site condition and baseline report describing any soil and groundwater contamination at the site and identifying any substance in or under the land that may constitute a pollution risk. The revised statement and report shall include, but not be restricted to;	
5a	a) the identification of all installation substances that are considered relevant hazardous substances (RHS), in line with TG-02 guidance and as defined in Article 3 of the Hazardous Substances Regulations, (EC) No 1272/2008, 16 December 2008, on classification, labelling and packaging of substances and mixtures.	Table 3.1 of the updated report provides the facilities relevant hazardous substances
5b	b) confirmation of the environmental setting, its significance and vulnerability to pollution as well as how it may be impacted upon by emissions from the proposed installation;	Addressed within Section 3.
5c	c) justification of the applicability of the soil and groundwater measurements provided in support of the baseline report. This justification shall include, but not be restricted to:	Addressed within Section 4.
5c(i)	c) justification of the applicability of the soil and groundwater measurements provided in support of the baseline report. This justification shall include, but not be restricted to:	Addressed within Section 4. Additional baseline testing of soils and groundwater will be undertaken during the installation of monitoring boreholes, prior to any materials being handled or stored on-site.
5c(ii)	(ii) confirmation that the sampling results obtained reflect the potential locations of emissions associated with the proposed installation.	Addressed within Section 4. Additional baseline testing of soils and groundwater will be undertaken during the installation of monitoring boreholes, prior to any materials being handled or stored on-site.
8	Identify any proposed design change made since the submission of the PPC Application with the potential to	

Information Notice Question Reference	Issue to be addressed	Addressed in section
	impact on the assessment of site condition and baseline report. Ensure that any such identified change is fully considered in the responses provided to Question 5 to 7 inclusive. The identification of relevant changes shall include but not be restricted to:	
8a	a) the introduction of any new relevant hazardous substance;	Additional relevant hazardous substances included within updated Table 3.1 and considered in subsequent sections of the report
8b	b) a change in storage method or location of any relevant hazardous substance; and	Additional storage methods added to updated Table 3.1 and considered in subsequent sections of the report
8c	c) a change in plant layout or drainage provision that may alter the pathway/behaviour of any released relevant hazardous substance.	Considered within section 3 of the report

2 Substances to be used at the Installation and Waste Materials to be produced

2.1 Materials handled on-site

The substances to be used at the PPC Installation (raw materials, products, by-products, wastes etc) and the proposed handling, storage and containment methods for their use have been reviewed by Acciona and an updated Table 3.1 is included within Appendix A. The table also identifies if the chemical component is a relevant hazardous substance (RHS). The Identification of hazardous chemicals was based on the review of the list of chemicals to be used or stored and a comparison to the list of chemicals in the following chemical databases:

<https://echa.europa.eu>

The appropriate storage and containment measures for each material will be taken, to avoid any fugitive emission of stored materials. This will include bunding of liquid storage tanks, to 110% of the volume of the largest tank or 25% of the total volume of multiple tanks (whichever is greatest) or double walled tanks. Level monitoring and alarms connected to the site SCADA, and interlocks to stop overfilling on storage tanks and silos and dust filters on silo pressure release valves.

2.2 Waste Accepted to Facility

The waste accepted at the facility will comprise of two main waste streams:

- **Contract Waste:** Consists of unsorted Local Authority Collected Waste (LACW) collected by, or on behalf of, the Authority and the Partner Councils.
- **Third Party Waste:** Consists of waste produced and brought to the Facility by others (e.g. local businesses). Third Party Waste will only be planned in the event of a shortfall in Contract Waste.

The types of waste that will be accepted by the plant will consist of MSW, delivered under the treatment contract with Aberdeen City Council, Aberdeenshire Council and Moray Council and commercial and industrial waste of a similar nature. The types of waste that will be accepted to the facility are provided in Table 3.2 below.

Updated Table 3.2: Waste to be processed

Waste type	EWC code	Description
Non-hazardous residual municipal waste	20 03 01	Mixed Municipal Waste
	20 03 02	Waste from Markets
	20 03 03	Street Cleaning Residues
	20 03 07	Bulky waste
	20 03 99	Municipal wastes not otherwise specified
Commercial and industrial non-hazardous waste	02 01 02	animal-tissue waste
	02 01 03	plant-tissue waste
	02 01 04	waste plastics (except packaging)
	02 01 07	waste from forestry

Waste type	EWC code	Description
	02 01 09	agrochemical waste other than those mentioned in 02 01 08
	02 01 99	wastes not otherwise specified
	02 02 02	animal-tissue waste
	02 02 03	materials unsuitable for consumption or processing
	02 02 99	waste not otherwise specified
	02 03 02	waste from preserving agents
	02 03 03	wastes from solvent extraction
	02 03 04	materials unsuitable for consumption or processing
	02 03 99	wastes not otherwise specified
	02 04 99	wastes not otherwise specified
	02 05 01	materials unsuitable for consumption or processing
	02 05 99	wastes not otherwise specified
	02 06 01	materials unsuitable for consumption or processing
	02 06 02	wastes from preserving agents
	02 06 99	waste not otherwise specified
	02 07 01	wastes from washing, cleaning and mechanical reduction of raw materials
	02 07 02	wastes from spirits distillation
	02 07 03	wastes from chemical treatment
	02 07 04	materials unsuitable for consumption or processing
	02 07 99	waste not otherwise specified
	03 01 01	waste bark and cork
Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard	03 01 01	waste bark and cork
	03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04*
	03 01 99	wastes not otherwise specified
	03 02 99	wood preservatives not otherwise specified
	03 03 01	waste bark and wood
	03 03 07	mechanically separated rejects from pulping of waste paper and cardboard
	03 03 08	wastes from sorting of paper and cardboard destined for recycling
	03 03 99	wastes not otherwise specified
Wastes from the Leather, fur and textile industries	04 02 09	wastes from composite materials (impregnated textile, elastomer, plastomer)
	04 02 10	organic matter from natural products (for example grease, wax)
	04 02 15	wastes from finishing other than those mentioned in 04 02 14
	04 02 21	wastes from unprocessed textile fibres
	04 02 22	wastes from processed textile fibres
	04 02 99	wastes not otherwise specified
Waste packaging, absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	15 01 01	paper and cardboard packaging
	15 01 02	plastic packaging
	15 01 03	wooden packaging
	15 01 04	metallic packaging
	15 01 05	composite packaging
	15 01 06	mixed packaging
	15 01 07	glass packaging
	15 01 09	textile packaging
	15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02*
	17 02 01	wood

Waste type	EWC code	Description
Construction and Demolition Waste	17 02 02	glass
	17 02 03	plastic
	17 06 04	insulation materials other than those mentioned in 17 06 01 and 17 06 03
Wastes from Human or Animal health care and/or related research (except kitchen and restaurant wastes not arising from immediate health care)	18 01 04	wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers)
	18 02 03	wastes whose collection and disposal is not subject to special requirements in order to prevent infection
Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	19 02 03	premixed wastes composed only of non-hazardous wastes
	19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
	19 02 99	wastes not otherwise specified
	19 05 01	non-composted fraction of municipal and similar wastes
	19 05 99	wastes not otherwise specified
	19 06 04	digestate from anaerobic treatment of municipal waste
	19 06 99	wastes not otherwise specified
	19 08 01	screenings
	19 09 01	solid waste from primary filtration and screenings
	19 09 04	spent activated carbon
	19 09 05	saturated or spent ion exchange resins
	19 09 99	wastes not otherwise specified
	19 12 01	paper and cardboard
	19 12 02	ferrous metal
	19 12 03	non-ferrous metal
	19 12 04	plastic and rubber
	19 12 05	glass
	19 12 07	wood other than that mentioned in 19 12 06
	19 12 08	textiles
	19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11	
Municipal Wastes (Household waste and similar commercial, industrial and institutional wastes) including separately collected fractions	20 01 01	paper and cardboard
	20 01 08	biodegradable kitchen and canteen waste
	20 01 10	clothes
	20 01 11	textiles
	20 01 25	edible oil and fat
	20 01 30	detergents other than those mentioned in 20 01 29
	20 01 32	medicines other than those mentioned in 20 01 31
	20 01 38	wood other than that mentioned in 20 01 37
	20 01 39	plastics
	20 01 40	metals
	20 01 41	wastes from chimney sweeping
	20 01 99	other fractions not otherwise specified
	20 02 01	biodegradable waste
20 02 03	Other non biodegradable waste	

3 Environmental Setting

3.1 Site geology

The available geology maps indicate that the site is underlain by late Devensian, Quaternary glacial deposits of the East Grampian Glaciogenic Group (EGGG). The north-western portion of the site is indicated to be underlain by deposits of the 'Tullos Clay Member' (TCM) which are described as "silty clay and sand, brown and red, laminated or massive, laid down in pro-glacial lakes, possibly brackish or glaciomarine". The majority of the site is identified to be underlain by the older 'Banchory Till Formation' (BTF) which is described as "diamicton, boulder and sandy, grey to yellow brown, with clasts of Daldarian metamorphic and Caledonian igneous rock. Matrix largely derived from decomposed rock".

A former sediment infilled channel is identified on the map immediately to the north of the site. The site is identified to be in the path of a former glacial meltwater channel (flow direction south-west to north-east). No indication of thickness of the superficial deposits is provided.

The solid geological map identifies the bedrock geology to comprises of the Aberdeen Formation "mixed beds of schist, grit, quartzite, psammite and local basic rocks".

There have been a number of ground investigations undertaken at the site. All of these investigations recorded the presence of made ground across the majority of the site. It is understood that the made ground has been removed from site as part of the construction work.

The underlying natural deposits comprise glacial deposits. The WYG investigation undertaken in 2018 recorded between 10 and 15m of very stiff glacial till. The impermeable nature of this material will limit the movement of any contaminants that may be released to the underlying bedrock.

3.2 Hydrology and hydrogeology

3.2.1 Hydrology

An unnamed watercourse enters the site from the western site boundary and is culverted beneath the site. The water feature runs in a north-eastern direction and exits the site at the northern boundary. The source of the watercourse is unknown.

The East Tullos burn issues approximately 500m to the north-east of the site to the north of the railway and flows in an eastern direction to Nigg Bay located approximately 1.25km to the north-east of the site. Based on the review of historical information it is considered likely that the culverted watercourse beneath the site discharges into the East Tullos Burn.

The Dee Estuary is present approximately 1km to the north of the site. The Dee flows in an eastern direction into the North Sea at Aberdeen Harbour.

No water quality for the culverted burn is understood to exist. As part of the EfW development the culvert has been diverted along the north-western perimeter of the site. The culvert has been constructed using precast concrete pipes which are sealed and tested to confirm impermeability.

3.2.2 Hydrogeology

The most recent groundwater vulnerability map produced by BGS shows that the area in which the site is located is classified as vulnerability class 4a. This classification characterises the site as being “vulnerable to those pollutants not readily adsorbed or transformed”. The area to the south-east of the site is classified as vulnerability class 5 which is described as “vulnerable to most pollutants, with rapid impact in many scenarios”.

BGS have also produced a report which contains maps of the superficial and bedrock aquifer productivity. From the superficial aquifer productivity map, the site appears to be located within an area of no productivity and high productivity. From the solid aquifer productivity map, the site appears to be located in an area of high productivity where the flow is inter-granular and through fractures.

SEPA have indicated that the bedrock belonging to the Aberdeen Formation is classed as a low productivity aquifer with fracture flow. The superficial deposits are not classed as a significant superficial aquifer. The quality of the groundwater in this area is shown on the SEPA interactive map to be “good”.

Recent ground investigations have confirmed the presence of groundwater at shallow depth beneath the site within the glacial deposits.

3.3 Emissions from proposed EfW Facility

Point source emissions to the underlying soils and groundwater will be prevented by the design and operation of the installation, including control measures.

3.3.1 Operations

The facility is being developed to fulfil the requirements of the Scottish Government’s Zero Waste Plan.

Hardstanding - The vast majority of the site will be covered by buildings and areas of hardstanding. The presence of hardstanding encapsulates the underlying soils and groundwater and will prevent any hazardous substances from being accidentally released to the underlying strata or groundwater. The integrity of the hardstanding will be inspected on a regular basis.

Process water - The facility has been designed to minimise water consumption by using a closed loop system, including the air-cooled condensing system, the feed chute cooling system and by reuse of wastewater within the process. This means that there will be no aqueous emission from the facility.

Surface water run-off – The drainage at the site has been designed in accordance with the relevant Building Regulations and British Standards. The design

incorporates a SUDs system to manage and control rainwater run-off from the building roofs and areas of hardstanding. The system removes pollutants from run-off through staged treatment (3 stages) of run-off prior to discharge.

Given the potential for a high water table at the site, all Suds features will include impermeable liners to ensure the run-off water is kept within the system and prevents risk of any pollution to the groundwater.

3.3.2 Control Measures

The substances to be used at the PPC Installation (raw materials, products, by-products, wastes etc) and the proposed handling, storage and containment methods for their use are presented within the updated Table 3.1 (Appendix A).

Fuel will be stored in dedicated fuel tanks and powder reagents will be stored in silos. All tanks and silos will have level monitors.

The tanks that contain liquids will be bunded to prevent any emission in the event of spillage, with bunds designed to contain 110% of the largest tank capacity within the bund or 25% of the total capacity of the all the tanks within the bund, whichever is greater or the tanks will be double walled tanks.

Dry raw materials will be stored in silos that have filters attached to vents, to contain any particulate emissions during filling the silos.

The list of raw materials will undergo a regular review to ensure that consumption is optimised and that opportunities for reduction of use are implemented through the site's management system.

The operational design and control measures are considered to significantly lower the risk of any uncontrolled emissions to the underlying soils or groundwater occurring.

3.4 Conceptual Site Model for Proposed Site Activities

In order to allow the conceptual site model to be completed, the site activities were grouped into four main activities as follows:

- Waste Feedstock Management
- Hazardous substances managements (eg chemical used during on-site processes)
- Ash management
- Underground drainage system

Each activity has been assessed in the following table to determine the likelihood of an activity causing contamination of the receptors identified within the original Site Condition Report.

Table 1 : Conceptual Site Model

Activity	Source	Pathway	Receptor
<p>Waste Feedstock Management</p>	<p>The facility will be permitted to accept non-hazardous waste only.</p> <p>Non-conforming waste will be quarantined in a designated area for inspection and removal from site if necessary.</p> <p>Potential contaminants may include:</p> <ul style="list-style-type: none"> -metals Organics (eg hydrocarbons, volatiles and semi-volatiles) 	<p>Waste materials will be contained in a fully enclosed concrete bunker, which prevents the waste material from coming into contact with underlying soil and groundwater.</p> <p>No pathway for any contaminants to impact on the underlying soils or groundwater.</p>	<p>Low risk to human health or the water environment as there is no pathway for any contaminants to impact on underlying soils and groundwater.</p>
<p>Raw material management</p>	<ul style="list-style-type: none"> Urea solution (40%) Powdered Activated Carbon (PAC) Calcium Hydroxide (Ca(OH₂)) Ammonium Hydroxide (NH₄OH) (25%) Ammonium(NH₃ 19%w/w) Oxygen Scavenger (Carbohidracide) Monetilenglycol Trisodium phosphate (13%) Lightfuel oil Calibration gases (mixtures of ppm amounts if CO, CO₂, HCL, SO₂, C₃H₈, O₂, NH₃, NO in N₂) Lubricants (oil/grease) Hydraulic oil Corrosion inhibitor – alkaline wet solution (sodium nitrite 10/25%; sodium molibdate 10/20%, sodium hydroxide <0.5%) 	<p>All materials are stored in purpose designed above ground tanks or silos. All above ground tanks are to be bunded or if not bunded will be double walled tanks.. All tanks and silos are to be located in areas of hardstanding.</p> <p>Planned preventative management system will ensure that the tanks, bunds, concrete hardstanding and drainage system is inspected on a regular basis.</p> <p>No pathway for any contaminants to impact on the underlying soils or groundwater.</p>	<p>Low risk to human health or the water environment as there is no pathway for any contaminants to impact on underlying soils and groundwater.</p>

<p>Ash management</p>	<p>Air Pollution Control Residue (APCR) Incinerator Bottom Ash (IBA) Potential contaminants would comprise: -metals -Organics (PAHs, dioxins and furans)</p>	<p>APCR – 3 x 160 m³ above ground silo with dust filters. Removed off-site by specialist contractor in enclosed lorries. IBA –contained within water filled bottom ash extractor until it is conveyed to the ash hall. Removed off site by specialist contractor in covered vehicles.</p> <p>Planned preventative management system, will ensure that the bunkers, concrete hardstanding and drainage system is inspected on a regular basis.</p> <p>No pathway for any contaminants to impact on the underlying soils or groundwater.</p>	<p>Low risk to human health or the water environment as there is no pathway for any contaminants to impact on underlying soils and groundwater.</p>
<p>Underground drainage systems</p>	<p>Process waste water and surface water run-off Potential contaminants would comprise: -low or high pH -hydrocarbons -organics</p>	<p>The facility uses a closed loop system to reuse wastewater within the process. There will be no aqueous emission from the facility.</p> <p>The surface water drainage will collected run-off from roofs, site roads and other areas of impermeable surfacing where there is a minimal risk of surface waters being contaminated by waste or other materials.</p> <p>The operational area where there is the potential for contamination including the reception area, flue gas treatment areas etc will slope to the site sealed drainage which discharge to the waste water tank to be used within the ash extractors.</p> <p>Planned preventative management system, will ensure that the bunkers, concrete hardstanding and drainage system is inspected on a regular basis.</p>	<p>Low risk to human health or the water environment as there is no pathway for any contaminants to impact on underlying soils and groundwater.</p>

		No pathway for any contaminants to impact on the underlying soils or groundwater.	
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4 Site Investigations

Aberdeen City Council commissioned an intrusive investigation in August 2018. Ramboll was appointed as the Investigation Supervisor and the site investigation works were undertaken by White Young Green. The purpose of the 2018 site investigation undertaken by WYG was to *“inform the design of a new waste facility, by providing information on the geotechnical and geo-environmental conditions”*.

The ground investigation was not commissioned by Acciona as it was undertaken during the contract tender period. However, Acciona and Arup requested that a specific suite of chemical tests be undertaken on the soils and groundwater. This included specific tests in relation to IBA testing, APRc tests including dioxins and furans and others. Unfortunately, not all of the tests that were requested were undertaken.

The results of the chemical testing undertaken at the site to date have been provided within the previous revision of the site condition report as background information. It is acknowledged that the depth of sample collection may not represent the potential locations of emissions associated with specific activities at the facility.

However, a further post construction phase of intrusive investigation is to be undertaken. The locations of the exploratory holes will target the specific areas where materials are stored and used and will include the following:

- Adjacent to the bunker and warehouse.
- Adjacent to the boiler, urea/diesel storage and the bottom ash hall (BAH).
- Adjacent to the flue gas treatment hall (FGT) and chemical dosing area.
- Adjacent to the WTP and trucks parking area.
- Adjacent to the transformer, turbine and parking area.
- Adjacent to the FF room, weighbridges and car parking.

Acciona are in consultation with SEPA with regards to the proposed locations for the long term monitoring boreholes.

Both soil and groundwater samples will be collected from these locations and the results of the chemical testing will form the baseline data. Groundwater standpipes will be installed at all of the locations to allow long term monitoring. The suites for chemical testing of the soils and groundwater will be set out with the Monitoring Plan.

5 Conclusions and Statement of Site Condition

Acciona appointed Arup to prepare a Site Condition Report for the site proposed to be used for the NESS EfW facility. The Site Condition Report is based on a desk study review of the historical land use, a review of the findings of the 2018 ground investigation and details of the proposed operations at the facility.

The early historical maps indicate that a mill dam was present in the western area of the site. A gas holder and associated infrastructure was constructed on the NESS site in the 1950s and remained on-site until recently. The surrounding area was developed as an industrial estate around the same time, with development continuing through the 1960s and 70s.

Site investigations undertaken on and in the vicinity of the site indicate that the ground conditions at the location of the proposed EfW facility comprise made ground overlying natural superficial deposits of clayey gravelly sand which is in turn underlain by very stiff glacial till. Bedrock is at significant depth beneath the site. It is understood that the made ground has been removed from site as part of the earthworks phase of the construction works.

The ground investigations have recorded concentrations of potential contaminants within the made ground and natural soils at expected ranges for industrial sites of this nature.

Asbestos containing materials was identified at three locations within the proposed development.

Leachate test results undertaken on the soil samples recorded elevated concentrations of polyaromatic hydrocarbons within the made ground.

Chemical testing on the groundwater samples has recorded metals, petroleum hydrocarbons, polyaromatic hydrocarbons, VOC's and BTEX compounds at concentrations above the SEPA resource protection values for groundwater and the SEPA surface water discharge for environmental Quality standards.

Once construction is complete and prior to the facility operating, an additional phase of ground investigation will be undertaken to install groundwater standpipes that will be monitored during the operation of the facility. Soil and groundwater samples will be collected and submitted for chemical testing. The suite of chemical testing will be agreed with SEPA in advance of the works commencing on-site, but as a minimum it will include any relevant hazardous substances that have not already been tested for.

The proposed installation will result in a number of potentially contaminative materials being brought to the site, including liquid and powder raw materials, oils and lubricants.

Following construction of the proposed development, the principal potential receptors for existing and future contamination are site workers and visitors, the underlying soils and drift and bedrock aquifers.

The proposed development will include extensive containment measures for the process areas which have the potential to release contaminants and these will limit the potential for spills or leaching of pollutants from the site directly to the underlying soils. The facility reuses wastewater within the process ensuring that there is no aqueous emission from the facility. The surface water drainage system will collect, manage and control run-off from roofs, site roads and other areas of permeable surfacing. Given the potential for high groundwater table beneath the site, all SuDs features will include impermeable liners to ensure the run-off water is kept within the system and does not pollute the underlying groundwater. Three levels of treatment will be undertaken prior to discharged to the East Tullos Burn Culvert.














Appropriate health, safety and environmental mitigation and monitoring measures are proposed as part of the development, including bunding of tanks or the use of double walled tanks and use of level alarms and segregation of foul and surface water drainage systems.










It is considered that the permitted activities to be undertaken at the site will not present a significant risk of pollution or harm due to the various containment measures provided by site infrastructure and the implementation of a planned preventative maintenance programme.

Appendix A

Updated Table 3.1



















Updated Table 3.1: Raw materials to be stored, used and handled on site and Waste Materials Produced and Stored

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
Demineralised Water	L	7732-18-5	None applicable. Not hazardous	No hazards classified	No	Insignificant	No	24,862m ³ /annum	Not stored on-site. Mains water	Feedwater required to run the boiler (entering via the water demineralisation unit)	Very low risk.
Urea Solution (40%)	L	57-13-6	N/A	No hazards classified	No	Potential skin, respiratory tract and eye irritant if released to air	Yes if released to the environment	936 tonnes/annum	Tank (60m ³) with level monitor and alarms.	Used as the reagent for reduction of nitrogen oxides (NOx) abatement.	
Powdered Activated lignite Carbon (PAC)	S	7440-44-0	R36/37/38	 	Yes	Estimate <1g/s release to air as total particulate. Fraction in APC/r fly as sent out for offsite treatment. None expected	Yes if released to the environment	76 tonnes / annum	Above ground 70/77m ³ silo with dust filters. Level monitor and alarms on silos.	APC reagent used for flue gas cleaning, to remove volatile heavy metals and organic compounds (dioxins/furans) from the flue gas	Silo within EfW building. Local dust filter for air expelled during filling. Spillages could be swept up therefore not considered to be a potential risk. Low risk with appropriate control measures in place.
Hydrated lime - Calcium Hydroxide (Ca(OH) ₂)	S	1305-62-0	R41	 	Yes	Relatively insoluble in water.	Yes if released to the environment	2464 tonnes / annum	Stored in 160/170 m ³ silo – 9 days storage capacity. Level monitor and alarms on silos.	APC reagent used for flue gas cleaning, to remove acid flue gas components and SO ₂ /SO ₃ and CO ₂	Silo within EfW building. Local dust filter for air expelled during filling. Spillages could be swept up. Low risk with appropriate control measures in place.
Ammonium hydroxide (NH ₄ OH) (25%)	L	1336-21-6	R34, R50	 	Yes		Yes if released to the environment	24 tonnes / annum	Supplied on-site as industrial solution in exchangeable Cubitainers [®]	Feedwater alkalisation injected into the suction line of the feedwater pumps (steam condensate system) Waste process water used for IBA, flu gas quenching and cooling the intermittent blowdown tank.	Kept in designated store located in FGT area, over tray containment. Bund 110% capacity of tank. Spill kit available. Low risk with appropriate control measures in place
Ammonia (25% dilution)	L	1336-21-6	R34, R50	 	Yes	Very soluble in water	Yes if released to the environment	952.65 litres/annum	Stored in 2 x 100L containers within warehouse		Kept in designated storage area
Ethylene glycol	L	107-21-1	H302, H373	 	Yes	Soluble in water	Yes if released to the environment	500 litres/annum	Supplied on-site as industrial solution 1000L container	Antifreeze in the cooling water system	Kept in designated storage area
Corrosion Inhibitor Alkaline wet solution Sodium Nitrite (10/25%)	L	7632-00-0 7631-95-0	R8, R25, R50 None noted	   None noted	Yes No	Very soluble in water -	Yes if released to the environment	50 litres/annum	Stored on site as industrial solution 25 litre container	Corrosion inhibitor in the cooling water system	Kept in designated storage area

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
Sodium Molybdate (10/20%) Sodium hydroxide (<0.5%)		1310-73-2	H290, H314		Yes	Highly soluble in water					
Oxygen Scavenger - Carbohydrazide	L	497-18-7	None noted	No hazards classified	No	Soluble in water	Yes if released to the environment	640 litres/annum	Supplied on-site as industrial solution 25L container	Water steam cycle chemical treatment	Kept in designated storage area
Ferric chloride	L	7705-08-0	H290, H302, H314, H318	 	Yes	Highly corrosive and acidic	Yes if released to the environment	397 litres/annum	Supplied on site as industrial solution 200L or 100L container depending on availability.	Chemical treatment in demineralised water production.	Kept in designated storage area
Sodium hydroxide (25%)	L	1310-73-2	H290, H314		Yes	Highly soluble in water	Yes if released to the environment	332 litres/annum	Supplied on-site as industrial solution 200L or 100L depending on availability	Chemical treatment in demineralised water production.	Kept in designated storage area
Antiscalent – Phosphoric Acid	L	7664-38-2	H290, H314		Yes	Soluble in water	Yes if released to the environment	61 litres/annum	Supplied on-site as industrial solution 25L	Chemical treatment in demineralised water production.	Kept in designated storage area
Sodium Bisulphate	L	7631-90-5	H302		Yes	Soluble in water	Yes if released to the environment	297 litres/annum	Supplied on-site as industrial solution 200L or 100L depending on availability	Chemical treatment in demineralised water production.	Kept in designated storage area
Trisodium phosphate (13%)	L	10101-89-0	R36, 37, 38	 	Yes	Highly soluble in water. Would alter pH of groundwater.	Yes if released to the environment	1046litres/ann um	1000 Litre container in secondary containment.	Corrosion Inhibitor for boiler protection.	Kept in designated storage area Any leaks from tanks would be contained within double walled tanks or tank bund.
Light Fuel Oil	L	64742-65-0	R45		Yes	Key contaminants of concern would be hydrocarbons, which could contaminate underlying soils and groundwater if spills/leaks occur.	Yes if released to the environment	18.6 tonnes per cold start up, following planned annual maintenance. 9.3 tonnes per controlled shutdown prior to annual maintenance or unplanned shutdown. 6 tonnes per hot start up, following unplanned shutdown.	Above ground double walled fuel tank. Level alarms	To achieve furnace IED temperatures at the time of plant start-up, and to maintain temperature requirements during abnormal conditions and shut-down. Fired in auxiliary burners, products of combustion emitted in flue gases after passing the FGT. Final emission to the stack.	Low risk with control measures in place and double walled tanks/ bunds/hardstanding /drainage system checked in accordance with a planned preventative maintenance programme.

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
Calibration gases (mixtures of ppm amounts of CO, CO ₂ , HCl, SO ₂ , (C ₃ H ₈ , O ₂ , NH ₂ , NO in N ₂)	G										
Carbon monoxide	G	630-08-0			Yes	High pressure gases. May explode if heated.	No	10 or 50 l bottles	Pressurised cylinders in storage cage	No need to be stored in the warehouse. This small bottle can be kept inside the CEMS enclosure. It is not propane but synthetic air, propane 15ppm.	Low risk with appropriate control measures in place.
Carbon Dioxide	G	124-38-9			Yes						
Hydrogen Chloride	G	7647-01-0	R34 R37		Yes						
Propane	G	74-98-6			Yes						
Oxygen	G	7782-44-7	R8		Yes						
Nitric oxide	G	10102-43-9	R8 R23 R34 R44		Yes						
Nitrogen	G	7727-37-9			Yes						
Lubricants (oil / greases)	L	6472-65-0	R45		Yes	Key contaminants of concern would be hydrocarbons, which could contaminate underlying soils and groundwater if spills/leaks occur.	Yes if released to the environment	As required	In purpose designed locked storage container	For plant maintenance. Waste oils will be disposed of by specialist contractor.	Any spills would be collected in oil/water interceptor. Low risk with control measures in place and tanks/bunds/hardstanding /drainage system checked in accordance with a planned preventative maintenance programme.
Hydraulic Oil	L	6472-65-0	R45		Yes	Key contaminants of concern would be hydrocarbons, which could contaminate underlying soils and groundwater if spills/leaks occur.	Yes if released to the environment	As required	In purpose designed locked storage container	For plant maintenance. Waste oils will be disposed of by specialist contractor.	Any spills would be collected in oil/water interceptor. Low risk with control measures in place and tanks/bunds/hardstanding /drainage system checked in accordance with a planned preventative maintenance programme.
Air Pollution Control (APC) residue – may include:	S										
Sodium		7440-23-5	R14/15 R34		Yes	Hazardous fine ash particles, including salts from the reaction of calcium hydroxide with acid gases, unreacted calcium hydroxide and activated carbon containing trace amounts of PAHs, dioxins/furans and heavy metals.	Yes if released to the environment	5,798 tonnes/annum	Fly ash - Collected in boiler ash hoppers and conveyed to separate ash silo. APCr/fly ash – stored in 3 x 160m ³ residue silos.	Waste arising from EFW plant. Stored on site until off site disposal.	Low risk with appropriate control measures in place.

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
Potassium		7440-09-7	R14/15/R34		Yes						
Calcium		7440-70-2	R15		Yes						
Chloride		16887-00-6			No						
Sulphate		14808-79-8	R20/22		No						
Arsenic		7440-38-2	R23/25 R50/53		Yes						
Chromium		7440-47-3	R40		Yes						
Cadmium		7440-43-9	R49 R48/23/25 R68		Yes						
Copper		7440-50-8	R11		Yes						
Barium					Yes						
Molybdenum		7439-98-7	R36/37/38		No						
Nickel		7440-02-0	R17 R40 R43		Yes						
Antimony		7440-36-0	R20/22R33R50/53 R61 62		Yes						
Vanadium		7440-62-2			No						
Zinc		7440-66-6	R50/53		Yes						
Lead		7439-92-1	R20/22R33R50/53 R61 62		Yes						
Mercury		7439-97-6	R23 R33 R50/53		Yes						
Nitrogen		7727-37-9			Yes						
Bicarbonate		144-55-8			No						
Magnesium		7439-95-4	R11 R15		Yes						
Iron		7439-89-6	R11		Yes						
Manganese		7439-96-5	R11		Yes						
Aluminium		7429-90-5	R15 R17		Yes						
Thallium		7440-28-0			No						
Selenium		7782-49-2	R23/25 R33 R53		Yes						
Tin		7440-31-5	R37/38		No						
Benzene		71-43-2	4546,1,36/38,48/23/24/25 ,65		Yes						
Toluene		108-88-3	R11 38 R48/20 R63 R65 R67		Yes						
Ethylbenzene		100-41-4	R11 R20		Yes						

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
m-xylene		108-38-3	R10 R20/21 R36/38	 	Yes						
o-xylene		95-47-6	R10 R20/21 R38	 	Yes						
p-xylene		106-42-3	R10 R20/21 R38	 	Yes						
Hydrocarbons		308067-35-0	R45		Yes						
Petroleum distillates (inc lub oil and mineral oil)		647-65-0		 	Yes						
Benzo(a)pyrene		50-32-8	R45 R11 R38 R65 R67 R50/53	  	Yes						
Naphthalene		91-20-3	R45 R11 R38 R65 R67 R50/53	  	Yes						
Other Volatile Organic Compounds					Yes						
Other Semi-Volatile Organic Compounds					Yes						
Dioxins & Furans					Yes						
1,2,3,4,6,7,8 heptachlorodibenzo-p-dioxin		35822-46-9	R12 R19 R20/22 R38 R45 R48/22 R52/53 R68	  	Yes						
1,2,3,4,6,7,8 heptchlorodibenzofuran					Yes						
1,2,3,4,7,8,9 heptachlorobibenzofuran					Yes						
1,2,3,4,7,8, hexachlorodibenzo- p-dioxin					Yes						
1,2,3,4,7,8 hexachlorodibenzofuran					Yes						
1,2,3,6,7,8, hexaxachlorodibenzo-p-dioxin					Yes						
1,2,3,6,7,8 hexachlorodibenzofuran					Yes						
1,2,3,7,8,9 hexachlorodibenzo-p- dioxin					Yes						
1,2,3,7,8,9 hexachlorodibenzofuran					Yes						
1,2,3,7,8 pentachlorodibenzo-p- dioxin					Yes						
1,2,3,7,8 pentachlorodibenzofuran					Yes						
2,3,4,6,7,8 hexachlorodibenzofuran					Yes						

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
2,3,4,7,8 pentachlorodibenzofuran					Yes						
2,3,7,8 terachlorodibenzo-p- dioxin		1746-01-6	R12 R19 R20/22 R38 R45 R48/22 R52/53 R68		Yes						
2,3,7,8 tetrachlorodibenzofuran					Yes						
Octachlorodibenzo-p-dioxin					Yes						
octachlorodibenzofuran		3268-87-9			Yes						
Incinerator Bottom Ash (IBA) -	S					Non-hazardous non- combustible material.	Yes if released to the environment	36,184 tonnes/annu m	Contained within water filled bottom ash extractor. Material will then be conveyed to the ash hall and allowed to cool prior to loading into open-top containers. These will then be taken to a semi-mobile treatment plant in Scotland.	Waste arising from EFW plant.	Low risk with appropriate control measures in place.
Sodium		7440-23-5	R14/15 R34		Yes						
Potassium		7440-09-7	R14/15/R34		Yes						
Calcium		7440-70-2	R15		Yes						
Chloride		16887-00-6			No						
Sulphate		14808-79-8	R20/22		No						
Arsenic		7440-38-2	R23/25 R50/53		Yes						
Chromium		7440-47-3	R40		Yes						
Cadmium		7440-43-9	R49 R48/23/25 R68		Yes						
Copper		7440-50-8	R11		Yes						
Barium					Yes						
Molybdenum		7439-98-7	R36/37/38		No						
Nickel		7440-02-0	R17 R40 R43		Yes						
Antimony		7440-36-0	R20/22R33R50/53 R61 62		Yes						
Vanadium		7440-62-2			No						
Zinc		7440-66-6	R50/53		Yes						
Lead		7439-92-1	R20/22R33R50/53 R61 62		Yes						

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
Mercury		7439-97-6	R23 R33 R50/53		Yes						
Nitrogen		7727-37-9			Yes						
Bicarbonate		144-55-8			No						
Magnesium		7439-95-4	R11 R15		Yes						
Iron		7439-89-6	R11		Yes						
Manganese		7439-96-5	R11		Yes						
Aluminium		7429-90-5	R15 R17		Yes						
Thallium		7440-28-0			No						
Selenium		7782-49-2	R23/25 R33 R53		Yes						
Tin		7440-31-5	R37/38		No						
Benzene		71-43-2	4546,1,36/38,48/23/24/25 ,65		Yes						
Toluene		108-88-3	R11 R38 R48/20 R63 R65 R67		Yes						
Ethylbenzene		100-41-4	R11 R20		Yes						
m-xylene		108-38-3	R10 R20/21 R36/38		Yes						
o-xylene		95-47-6	R10 R20/21 R38		Yes						
p-xylene		106-42-3	R10 R20/21 R38		Yes						
Hydrocarbons		308067-35-0	R45		Yes						
Petroleum distillates (inc lub oil and mineral oil)		647-65-0			Yes						
Benzo(a)pyrene		50-32-8	R45 R11 R38 R65 R67 R50/53		Yes						
Naphthalene		91-20-3	R45 R11 R38 R65 R67 R50/53		Yes						
Other Volatile Organic Compounds					Yes						
Other Semi-Volatile Organic Compounds					Yes						
Dioxins & Furans					Yes						
1,2,3,4,6,7,8 heptachlorodibenzo-p-dioxin		35822-46-9	R12 R19 R20/22 R38 R45 R48/22 R52/53 R68		Yes						
1,2,3,4,6,7,8 heptchlorodibenzofuran					Yes						

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
1,2,3,4,7,8,9 heptachlorobenzofuran					Yes						
1,2,3,4,7,8, hexachlorodibenzo- p-dioxin					Yes						
1,2,3,4,7,8 hexachlorodibenzofuran					Yes						
1,2,3,6,7,8, hexachlorodibenzo-p-dioxin					Yes						
1,2,3,6,7,8 exachlorodibenzofuran					Yes						
1,2,3,7,8,9 hexachlorodibenzo-p- dioxin					Yes						
1,2,3,7,8,9 hexachlorodibenzofuran					Yes						
1,2,3,7,8 pentachlorodibenzo-p- dioxin					Yes						
1,2,3,7,8 pentachlorodibenzofuran					Yes						
2,3,4,6,7,8 hexachlorodibenzofuran					Yes						
2,3,4,7,8 pentachlorodibenzofuran					Yes						
2,3,7,8 terachlorodibenzo-p- dioxin		1746-01-6	R12 R19 R20/22 R38 R45 R48/22 R52/53 R68		Yes						
2,3,7,8 tetrachlorodibenzofuran					Yes						
Octachlorodibenzo-p-dioxin		3268-87-9			Yes						
octachlorodibenzofuran		3268-87-9			Yes						
Process Waste Waters may include:	L					Could contaminate underlying soils and groundwater if released to the environment.	Yes if released to the environment	N/A	6m ³ below ground storage. Level alarms.	Process waste water and waste water will be reused in the process of the plant. Water quality is suitable according to process consumers requirements. Process waste water will be used for the FGT and waste water for deslagger cooling.	Low risk with appropriate control measures in place.
Cadmium		7440-43-9	R49,R48/23/25 R68		Yes						
Mercury		7439-97-6	R23 R33 R50/53		Yes						
Gamma hexachlorocyclohexane (HCH)		319-86-8			Yes						

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
Dichlorodiphenyltrichloroethane (DDT)		50-29-3	R40 R48/25 R50/53		Yes						
Pentachlorophenol		87-86-5	R24,25,26,36/37/38,40,50/53		Yes						
Hexachlorobenzene(HCB)		118-74-1			Yes						
Hexachlorobutadiene (HCBd)		87-68-3	R45 R48/25 R50/53		Yes						
Aldrin		309-00-2	R24/25,40,48/24/25,50/53		Yes						
Dieldrin		60-57-1	R25, 27, 40, 48/25, 50/53		Yes						
Endrin		72-20-8	R24, R28, R50/53		Yes						
Tetrachloromethane (Carbon Tetrachloride)		56-23-5	R23/24/25,40,48/23 52/53, 59		Yes						
Polychlorinated Biphenyls		1336-36-3			Yes						
Dichlorvos		62-73-7	R24/25, R26 R43 R50		Yes						
1,2 Dichloroethane		107-06-02	R45 R11 R22 R36/37/38		Yes						
Atrazine		1912-24-9	R43 R48/22 R50/53		Yes						
Simazine		122-34-9	R40 R50/53		Yes						
Tributyltin compounds		various	R21, 25, 36/38, 48/23/25		Yes						
Triphenyltin compounds		various			Yes						
Trifluralin		1582-09-8	R36 R43 R50/53		Yes						
Fenitrothion		122-14-5	R22 R50/53		Yes						
Azinphos-methyl		86-50-0	R24 R26/28 R43 R50/53		Yes						
Malathion		121-75-5	R22		Yes						
Endosulphan		115-29-7	R24/25 R36 R50/53		Yes						
Chloroform		67-66-3	R22 R38 R40 R48/20/22		Yes						
1,2,3 Trichlorobenzene		87-61-6	R22 R38 R50/53		Yes						

Stage 1 Chemicals Handled	Stage 2 Chemical Characteristics and Toxicity							Stage 3 Site Specific Characteristics			Stage 4 Site Specific Risk
Material	State S Solid L Liquid G Gas	CAS No.	Risk Phrases (CHIP)	CLP Hazard Phrase	Hazardous Substances under Stage 2 (Yes/No)	Environmental Fate and behaviour	Potential Pollution Risk	Estimated Quantity Used	Storage Arrangement	Delivery, Storage and use details	Comments/Chemical of Concern?
1,2,4 Trichlorobenzene		120-82-1	R22 R38 R50/53		Yes						
1,3,5 Trichlorobenzene		108-70-3	R22 R38 R50/53		Yes						
Benzene		71-43-2	45,46,11,36/38,48/23/24/ 25,65		Yes						
Toluene		108-88-3	R11,38,48/20,63,65,67		Yes						
Ethylbenzene		100-41-4	R11, R20		Yes						
m-xylene		108-38-3	R10, R20/21, R38		Yes						
o-xylene		95-47-6	R10, R20/21, R38		Yes						
p-xylene		106-42-3	R10, R20/21, R38		Yes						
hydrocarbons		308067-53-0	R45		Yes						
petroleum distillates (inc lub oil and mineral oil)		64742-65-0	R45		Yes						
Benzo(a)pyrene		50-32-8	R45,11,38,65,67,50/5 3		Yes						
Naphthalene		91-20-3	R22, R50/53, R40		Yes						
Waste to be processed (see updated Table 3.2 below)	S	Various	-		No	Only non-hazardous waste is to be accepted at the facility.	Yes if released to the environment	150,000tonne s/ annum	Enclosed waste bunker	Delivered to site by waste delivery vehicle and off loaded in enclosed tipping hall	Low risk with appropriate control measures in place.