SIMEC USKMOUTH POWER - ENVIRONMENTAL RISK ASSESSMENT

Simec Uskmouth Power Ltd - EPR/LP3131SW

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1 INTRODUCTION

1.1.1 Simec Uskmouth Power Ltd are applying to vary their existing Environment Permit (EPR/LP3131SW) to facilitate the proposed conversion from coal and biomass to fuel pellet and biomass. A full technical description of the plant and the proposed conversion can be found in the Permit Variation Supporting Information and is not reproduced in supporting studies or appendices Simec Uskmouth Power - environmental risk assessment (ERA) is Appendix G to Permit Variation Supporting Information.

1.1.2 This ERA includes an assessment of the risk to the environment and human health from the proposed SUP conversion. The Environment Agency's (EA) risk assessments for your environmental permit[1] (adopted by Natural Resources Wales) covers a range of environmental risks. Those aspects relevant to the operation of the Simec Uskmouth Power (SUP) conversion are covered within the following sections:

- amenity and accidents
- emissions to air
- emissions to water; and
- global warming potential

1.1.3 The assessment of emissions to air, water and global warming potential is supported by the H1 assessment software tool, which can be found in Appendix A to this Environmental Risk Assessment.

1.1.4 This document provides the relevant risk assessments covering the above aspects.

[1] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

2 AMENITY AND ACCIDENTS

2.1.1 This section provides an assessment of risks to environmental amenity and from accidents that could arise from operation of the proposed converted SUP facility. The assessment has been completed in accordance with the EA's risk assessments for your environmental permit[1].

2.1.2 The scope of the assessment has covered the following aspects:

- odour;
- noise and vibration;
- fugitive emissions;
- visible emissions; and
- accidents.

2.1.3 For each of the above, the approach to the assessment has followed the following four stage process:

1. identify the hazards;
2. assess the risks (assuming that any control measures proposed are in place);
3. choose appropriate further measures to control these risks (if required); and
4. present the assessment of overall risk.

2.1.4 Results of the assessment are provided in the following tables.

Table 2.1 Assessment of odour risks

Table 2.4	Assessment of visible emission risks
Table 2.5	Assessment of accident risks

2.1.5 In completing the assessment, prevention and control measures proposed by SUP are assumed to be in place. Where relevant, details of these measures are identified within the assessment.

Table 2.1: Odour Risk Assessment and Management Plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
Odour emissions from the fuel pellet unloading facilities, delivery vehicles (rail cars and lorries) and storage silos.	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The fuel pellets are subject to upstream treatment before arriving at the site. This includes heat treatment which removes the majority of volatile compounds which could potentially cause odour. The stringent fuel specification with which suppliers must comply ensures minimal/no odour issues with the fuel pellets. The delivery vehicles (rail and road) will be enclosed were possible to prevent odour releases. The fuel unloading facilities are under cover but not enclosed. Fuel pellets will not be stored in the unloading facilities but promptly transferred to the storage silos via enclosed conveyors and are unlikely to be a source of odour. Fuel pellets will be used on a first in first out basis to avoid prolonged storage. Pellets storage in the primary storage silos is anticipated to be up to a maximum of 15 days under normal operating conditions. Pellet storage duration in the day silos is anticipated to be up to 24 hours and therefore is unlikely to be a source of odour. High standards of housekeeping will be maintained to ensure that the fuel silos remain free of build-up of feedstock and that any material which is accidentally deposited outside of the fuel silos are cleared up immediately. Odour will be routinely monitored as part of the daily inspections with further monitoring following an odour complaint and records of all inspections will be kept. Prior to a planned shutdown, fuel pellet levels would be run down and the fuel supplier notified well in advance in order to organise the supply accordingly. During an unplanned shutdown, the fuel supplier will be notified immediately to stop fuel deliveries. The fuel already stored on site will remain in the fuel silos for the duration of the unplanned shutdown. In the event of a complaint, the complaints procedure will be followed to record and act on the complaint and instigate appropriate action.	Very low	Low - minor odour annoyance (at worst)	Not significant

Table 2.2: Noise and Vibration Risk Assessment and Management Plan

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Noise from rail deliveries and vehicle movements onsite and offloading (such as reverse warnings)	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The delivery system will replicate historic delivery patterns with fuel pellets delivered by rail. Operational consumable and biomass delivered by road, ash transported from site by road. Road delivery of fuel pellets will only occur only in the event of an unexpected outage of the rail network. The quantities of abatement reagents will increase due to the fuel change but this will not significantly increase the number of HGV movements. Main traffic movements associated with the SUP will occur from 07:00 to 19:00 seven days a week, including bank holidays except Christmas Day, Boxing Day and New Year's Day. Noise mitigation measures have been incorporated within the design (see Appendix M of the main application document for details). In the event of a complaint, the complaints procedure will be followed to record and act on the complaint and instigate appropriate action.	Low to Medium However, noise would be intermittent and deliveries will be made between 07:00 and 19:00.	Low Noise modelling undertaken demonstrates that the noise effects of operational traffic will not be significant.	Not significant
Noise from conveyor system	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The noise from the conveyor system will remain largely unchanged from the current operation. The existing conveyors from the rail unloading facility will remain. The road unloading facility will have new conveyors installed to transfer fuel pellets to the primary storage silos. Road deliveries of fuel pellets will occur infrequently and only in the event that rail deliveries are temporarily unavailable. New conveyors will transfer fuel pellets from the primary storage silos to the existing conveyor system which transfers fuel pellets to the day silos and on to the combustion units. All conveyors are enclosed and the noise has been assessed in the noise assessment in Appendix M.	Low to Medium	Low	Not significant
Noise from main boiler house.	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	There will be no change in the main combustion units as a result of changing the fuel. As such noise associated with the combustion plant within the boiler house is not expected to change. The SUP facility encloses nearly all of the principle plant items within a building, with the exception of the cooling towers which needs to be located externally to reject low grade waste heat to the atmosphere. Vehicular access to the boiler house is via shutter doors electrically and manually operated from the inside the boiler house. The shutter doors are routinely maintained in closed position. Pedestrian access to the boiler house is via the north and south wall. These doors have maglocks and secure access via fob system. In the event of a complaint, the complaints procedure will be followed to record and act on the complaint, and instigate appropriate action	Low	Low Unlikely to cause annoyance to sensitive receptors. Noise modelling undertaken demonstrates that the noise effects of plant operation are not significant	Not significant
Vibration from the plant	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Land	There will be no change in the main combustion units as a result of changing the fuel. As such vibration associated with the combustion plant within the boiler house is not expected to change. Significant vibration effects are not associated with the plant used. In the event of a complaint, the complaints procedure will be followed to record and act on the complaint and instigate appropriate action.	Low	Low Noise assessment considered that significant vibration effects from the SUP facility during its operation were unlikely.	Not significant

Table 2.3: Fugitive Emissions Risk Assessment and Management Plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
To Air						
Dust from fuel pellet deliveries and handling	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The fuel pellets will be required to conform to the stringent fuel specification which includes a minimum particle size. Fuel quality will be closely monitored at the point of production by the fuel supplier and upon delivery to SUP. Significant amounts of dust are not anticipated be associated with the fuel pellets. Fuel pellets will be delivered to the site in enclosed vehicles). The unloading facilities will be under cover but not enclosed. From the unloading facility the fuel pellets will be transferred to the primary storage silos via enclosed conveyors. All further transfer to the combustion units (whether direct or via the day silos) will be via enclosed conveyor. Pellets will be transported around the site in enclosed conveyors thereby minimising dust creation. Operational Plant walk arounds will assess potential dust build up.	Low	Low Nuisance, dust on windows, cars etc.	Not significant
Dust from the milling process	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The milling process will remain unchanged from the currently permitted activity except that the fuel to be milled with be fuel pellets and biomass instead of coal and biomass. As such there will be no change in the risk of dust from this process and no changes to the management of dust are proposed.	Low	Low	Not significant
Lime deliveries and handling	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	Lime deliveries remain unchanged and continue to be delivered to site via a sealed connection system between the road vehicle and storage tank. Level monitoring will be included and will be linked to a switch to prevent overfilling of storage tank. Any spillage of material during a delivery, for example during disconnection of the hose would be cleared immediately. Storage vessels are fitted with filters to minimise fugitive emissions of dust.	Low	Low Nuisance, dust on windows, cars etc.	Not significant
Powdered activated carbon deliveries and handling	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	Deliveries will be made via enclosed road tanker with sealed hose connection to the storage vessel. Level monitoring will be included and will be linked to a switch to prevent overfilling of storage tank Any spillage of material during a delivery, for example during disconnection of the hose would be cleared immediately. Storage vessels will be fitted with a filter to minimise fugitive emissions of dust.	Low	Low Nuisance, dust on windows, cars etc.	Not significant
Solid urea deliveries and handling	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (closest is Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	Deliveries use a sealed connection system between the road vehicle and relevant storage tank. Level monitoring will be included and will be linked to a switch to prevent overfilling of storage tank All storage tanks and fill points will be located within a bunded area. Storage vessels will be fitted with a filter to minimise fugitive emissions during loading.	Low	Low	Not significant

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
Urea solution and Chlorout deliveries and handling	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (closest is Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	Urea and Chlorout deliveries use a sealed connection system between the road vehicle and relevant storage tank. Level monitoring will be included and will be linked to a switch to prevent overfilling. All tanks will be fully bunded with a capacity of 110% of the stored volume of the largest tank within the bund and will be subject to routine inspection during routine site maintenance visits. All tanks will be compliant with the Oil Storage Regulations. Spill kits will be provided to contain and clean up any spills identified and all maintenance staff will be trained by their supervisors in the appropriate actions to be conducted in the event a spill is detected. Anyone using spill kit materials will be required to ensure replacements are ordered to ensure the spill kit inventory is re-stocked.	Low	Low	Not significant
Dust from bottom ash and fly ash (APC residue) handling and storage	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The techniques for handling residues will remain broadly similar as currently permitted. Bottom ash will discharge from the under-fired grate into the ash crushers. High pressure water jets wash the ash from the ash crusher to the settlement tank located adjacent to coalstock yard. Covered vehicles will remove the bottom ash in covered vehicles may be inspected prior to leaving site. Fly Ash (APC residue) in the flue gas will be removed using the existing bag filter system. It is collected in a hopper and pneumatically conveyed into a bulk pulverised fuel ash silo for disposal. The APC residue is discharged into sealed road tankers via a sealed connection. The silo and the pneumatic transfer system conveyors are all located within FGD plant. Releases through equipment failure may be contained and removed by vacuum cleaning. Filters on APC silo vent collect dust released during filling and are fitted with a differential pressure alarm and automatic cleaning. In the event of a spillage of either residue, Operators are required to arrange for cleaning immediately.	Low – the residue handling systems are fully contained. During routine plant walkovers, any leakage would be identified.	Medium – material is hazardous and fine.	Not significant
VOCs from deliveries and storage of gas oil	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The usage and storage arrangements for gas oil will not change as a result of the proposed change in the main fuel for the combustion units. Delivery vehicles offload using a sealed connection. The storage vessel has a vent to permit tank breathing. Emissions from this source will not change and are not considered to be significant since the material being stored will be relatively non-volatile. The integrity of all liquid storage containers is subject to routine checks as part of daily site inspections.	Low	Low	Not significant
VOCs from deliveries and storage of transformer oils	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The use and storage of transformer oil will not change as a result of the proposed change in fuel. Transformer oil top-up is infrequent and limited in amount. The integrity of transformers is subject to routine checks as part of daily site inspections.	Low	Low	Not significant
To Water						
Run off from fuel silos	Severn Estuary via reen system and site drainage system Ground	Ground/ surface drains	The primary and day fuel silos will be designed to be water tight and be constructed of thick concrete walls and base. The fuel pellets will be subject to upstream treatment including a drying stage prior to arriving at the site and will conform to a fuel specification including moisture content. Leachate is very unlikely to be produced from the fuel pellets. During shutdown periods, the silos will be visually inspected as far as possible, to ensure that they are in a good state of repair.	Low	Very low – run off water will have no contact with fuel pellets and will be clean rain water run off	Not significant

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
Run off from bottom ash settlement and storage	Severn Estuary via site drainage system Ground	Ground/ surface drains	Water from bottom ash settlement is collected in a dirty reservoir which overflows into the site drainage system and is directed to the storm water sump. Water from the storm water sump is treated for grit and particulate removal prior to use in the cooling towers. Water quality is monitored in the cooling tower pond prior to use. Run off from the ash storage area is culverted to a settlement area before passing through an oil separator before being discharged to the drain system. Process areas are appropriately surfaced and drains collect waters for re-use.	Low	Low/medium Run off volumes are expected to be low	Not significant
Transfer, storage and removal of bottom ash	Severn Estuary via site drainage system Ground	Ground/ surface drains	Bottom ash handling and transfer will be undertaken within a building with an impermeable surface. A clamshell type grab will transfer the material from the drainage apron adjacent to the settlement pits into road vehicles to be moved to the purpose build storage area. Any spillage of bottom ash would be cleaned up immediately using dry techniques. A spillage management plan will be in place. Covered vehicles will remove the bottom ash, vehicles may be inspected prior to leaving site. Should any bottom ash enter the station drains this will collect within the storm water drainage sump which can be isolated to avoid discharge.	Low	Low – any aqueous release would be small	Not significant
Transfer, storage and removal of fly ash (APC residues)	Severn Estuary via site drainage system Ground	Ground/ surface drains	Fly Ash (APC residues) are handled within a fully enclosed FGD system The fly ash residues will be stored in silos and discharged via sealed connections into fully contained disposal vehicles. In the event of a fly ash (APC residue) spillage operators will be required to arrange for cleaning immediately. Any releases through equipment failure will be contained and can be removed by vacuum cleaning. Fly ash will not be washed down to drain under any circumstances. A spillage management plan will be in place. In the unlikely event that APC residues enter the internal drainage system this drains to the storm water sump which can be isolated to avoid discharge. Removal of APC residues from site will be monitored by site personnel and vehicles may be visually inspected prior to leaving site to ensure they are free from residue deposits.	Low	Medium	Not significant
Storage and transfer of solid reagents	Severn Estuary via site drainage system Ground	Ground/ surface drains	Reagent materials are stored and transferred within a building with an impermeable surface. The exact location of reagent storage will be subject to detailed design and is not currently finalised. Once the location and design of storage is finalised this risk assessment will be updated accordingly. An impermeable surface will underlay all chemical storage areas to prevent fugitive emissions to ground and groundwater should a minor spill occur. A spillage management plan will be in place. Site drains discharge into the storm water sump which can be isolated should a spill occur prior to discharge. Sump discharge can be controlled and contents are monitored within cooling water system	Very low Spillage would be contained.	Low/medium	Not significant
Leak of diesel/fuel oil from storage area	Severn Estuary via site drainage system Groundwater Ground	Ground/ surface drains	The storage arrangements for diesel / fuel oil will not change as a result of the change in fuel for the combustion units. An impermeable surface will underlay all chemical and oil storage areas to prevent fugitive emissions to ground or groundwater should leaks occur. Deliveries are all overseen by a trained member of staff, who will ensure that there is sufficient capacity within the storage vessel for the delivery. The storage tank is within a bund to contain any spillage and a drip tray is provided to contain any minor spillage during connection/disconnection of the delivery hose. Diesel and auxiliary fuel storage area will be appropriately bunded in accordance with oil storage regulations. Rainwater collected within the bund is tankered off site for disposal. Surface water run-off from hardstanding areas will be captured by drains that flow into the storm water sump. This sump discharges to the cooling water system is controlled. Spill kits will be available to contain and clean up any spills. A spillage management plan is in place. A procedure will be designed to ensure that any damaged or leaking containers are dealt with and to allow regular inspections for any signs of deterioration.	Very low A release would require failure of both primary and secondary containment. Operational management procedures will reduce the risk of this happening.	Medium/high Contamination of drainage system	Not significant

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
Run off/leak from maintenance oils storage	Severn Estuary via site drainage system Groundwater Ground	Ground/ surface drains	The storage arrangements for maintenance oils storage will not change as a result of the change in fuel for the combustion units. A hard, impermeable surface will underlay all chemical and oil storage areas to prevent fugitive emissions to groundwater should leaks occur. The oil storage areas will be appropriately bunded. Rainwater collected within the bund is tankered off site for disposal. Surface water run-off from hardstanding areas will be captured by drains that flow into the storm water sump. This sump discharge to the cooling water system is controlled. Any spillage of material during a delivery would be contained and cleared immediately. Spill kits are located close to the ammonia tank to contain any spillage. A spillage management plan will be in place. A procedure will be designed to ensure that any damaged or leaking containers are dealt with as soon as practicable and to provide for regular inspections to identify as soon as possible any signs of deterioration. Regular visual inspections of the maintenance oil storage area will be completed to allow for early detection of any sign of damage/leaks and trigger immediate remedial action.	Low A release would only occur in the event of an accident/incident and would require failure of both primary and secondary containment. Operational management procedures will prevent this from happening.	Low/medium Small volumes of maintenance oils will be stored on site	Not significant
Leak from urea or Chlorout solution tank or during delivery	Severn Estuary via site drainage system Groundwater Ground	Ground/ surface drains	Deliveries use a sealed connection system between the road vehicle and storage tank. Level monitoring will be included and will be linked to a switch to prevent overfilling. The storage tank and fill point will be located within a bunded area. Delivery vehicles will be located in a dedicated surfaced delivery point. Any spillage of material during a delivery would be contained and cleared immediately. Spill kits are located close to the ammonia tank to contain any spillage. Spillage procedures will be in place. Penstock valves on the attenuation ponds would be closed in the event of a spillage to contain the spill onsite. These valves can be remotely actuated.	Very Low	Medium/high	Not significant
Litter						
The fuel is delivered to site in the form of pellets which would be unlikely to be windblown. The delivery process is also fully contained and managed so as to avoid this risk.	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Windblown to air	N/A	N/A	N/A	N/A
Pests						
Flies, and other pests or vermin in fuel pellet storage area	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Air	The fuel pellets are subject to upstream pre-treatment prior to delivery to the site. This pre-treatment includes the use of heat and pelletising process would eliminate pests within in the delivered fuel. The fuel pellet storage silos themselves are fully enclosed. All fuel pellet deliveries will be in enclosed vehicles and transfer to the primary storage silos is via enclosed conveyors. Unloading facilities are not enclosed, fuel pellets will only be in residence for a short period of time before being conveyed to primary storage. Good housekeeping procedures will be developed and applied to ensure all fuel pellets are correctly offloaded from vehicles. Any unexpected spillage would be cleaned up promptly. Pest control measures will be applied in accordance with recommendations from a specialist pest control advisor. In the event of a complaint, the complaints procedure will be followed to record and act on the complaint and instigate appropriate action.	Low Good site management procedures should prevent this occurring. Closest residential receptors located approx 1.5 km from the site	Low	Not significant

Table 2.4: Visible Emissions

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Plume from emission stacks	Local residents (nearest receptors approx. 1.5 km to the east of the installation). Industrial units (including Severn Power Station, Liberty Steel Newport and Nash Sewerage Works located within 500 m of the installation).	Visual	Visible plumes are not anticipated to occur for the majority of operational time due to the temperature at which the treated flue gas exits the stack. This is expected to be similar to the currently permitted combustion activity and there is no increased risk of visible plumes.	Low	Low – Minor visual disturbance	Low

Table 2.5: Accidents Risk Assessment and Management Plan

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Operator error	Air/Water/Land - dependent on nature of the error	Variable - dependent on nature of the error	The plant will be automatically controlled under normal operation, thereby minimising the potential for operator error. The automatic control system will include alarms to alert the Operator of potential operational problems and where relevant will be triggered with sufficient safety margin to permit operator intervention. All operational staff will be fully trained against the site operating procedures. Training will include raising awareness of key plant parameters and the potential implications of failure to control operations as designed and the associated potential impact on the environment.	Low	Variable depending upon nature of incident	Not significant provided operating procedures are followed
Loss of power	None	N/A	In the event of a loss of power during normal operation, the unit will trip and shutdown. The emergency station generators will start when the unit trips, to support the safe rundown of the unit. In the event of a loss of power to the site during non-operational periods the plant would not be able to start-up and therefore no operations can commence.	N/A	N/A	N/A
Loss of containment during storage or transfer of reagents, chemicals and oil (transformer and lubricating oil)	Severn Estuary via site drainage system Groundwater Ground	Ground/ surface drains.	A spillage management plan is already in place and will be updated to include urea solution and Chlorout which will be stored on site. Storage of urea solution, oils and boiler water treatment chemicals are or will be in bunded tanks. All bunds are visually inspected every day to ensure that they are empty. Bunds have capacity to contain at least 110% of the tank contents. The oil storage tank will be designed to be compliant with the oil storage regulations. All process storage tanks have been built of suitable materials which are resistant to the vessel content. A maintenance programme will be established for the inspection of all storage tanks. Lime will be stored in a silo outside adjacent to the stack. This is in a similar location to the existing lime silo but the volume will be increased. All other reagents, chemicals and residues will be stored within silos inside a building. Spillage from these silos will be contained, on hardstanding and will be dry materials that will immediately be vacuum cleaned. Spillage from tanker connections or from the storage vessels and transfer pipes will be contained within a building and on concrete hardstanding. These will predominantly be solids therefore easier to clean up. However, any liquids or dirty water from cleaning will be collected by the internal drains and supplied to the storm water sump. Potential release to groundwater would require simultaneous failure of the storage tank and containment (e.g. bunds, surface drains and sumps). Bulk deliveries will be overseen by a trained member of staff who will be responsible for checking that there is sufficient capacity in the storage vessel to receive the delivery. A site spill procedure will be developed and followed in the event of a spillage. Spill kits will be available to contain and clean up the spill. Solid raw materials will be cleaned using dry techniques. Incidents will be recorded and investigated appropriately according to the site incident procedure. Significant incidents will be reported to NRW in accordance with the requirements of the permit.	Very Low – requires multiple failure events	Medium/High Contamination of local water course - dependent on quantity and material released	Not significant as long as delivery procedures are adhered to, and in the event of a spillage, the spill management plan is followed.
Fire in fuel silos causing emissions to air	Air	Direct release of combustion gases to air	Silo management procedures will be in place to ensure that a first in first out system is maintained, storage for more than 15 days is not anticipated, thus reducing potential for deposition of dust and minimise the potential for self ignition.	Low	Low /Medium	Not significant

			Fuel pellet management and acceptance procedures will be established to ensure that maximum storage times are complied with. Fire protection systems will be in place in accordance with those set out in the fire prevention and mitigation plan (FPMP). These will include automatic fire detection and suppression in the silos. Water will not be used to supress a fire in the primary storage silos. The aim of the FPMP is to as far as practicable minimise the duration of a fire event to less than 4 hours.		Uncontrolled release of combustion gases to air – impacts likely to be short term	
Failure to contain firewater	Severn Estuary via site drainage system Groundwater Ground	Ground / surface drains	Measures are currently in place to protect against fire including measures to manage and contain fire water from the permitted combustion plant. The majority of these measures will not change as a result of the change in fuel for the combustion units. As a result of the change in fuel, fuel pellets will be stored on site, within the primary storage silos and transferred to day silos ahead of combustion. The new measures in place relating to the fuel pellet storage areas are detailed within the FPMP. The installed fire response systems will ensure a rapid response thereby addressing the fire at the earliest point to avoid fire spread. In addition, this system does not make use of water to supress fire in the storage silos. There will therefore be no increase in the potential volumes of fire waters as a result of the storage of fuel pellets. In the event of a fire elsewhere on the site firewater would be collected in the site drains, which lead to the storm water sump which can be isolated prior to discharge. Contained firewater would be tested and disposed of a suitably licensed facility. A summary of the existing measures in place for firewater containment is within the FPMP.	Low – plant designed to contain firewater	Medium	Low
APC equipment failure	Air	Stack	All abatement plant is continuously monitored (i.e. reagent flow and consumption/bag filter pressure) to ensure that it is operating as designed and that the reagent feed systems are working. The APC plant (silo and pneumatic transfer conveyers) are located within the main boiler house therefore any releases due to equipment failure will be contained and can be removed via vacuum cleaning immediately. In addition, emissions to air via the main stack are continuously monitored for key pollutants which would identify any potential increases in pollutant concentrations. All of these systems will include appropriate alarms to alert the Operator to a potential problem and appropriate action to be taken. Where monitoring of NOx emissions indicates increasing concentrations, an injection of urea will automatically be adjusted to address this. Fuel feed into the furnace will be prevented at start up until a gas temperature of 850ºC has been reached. The SUP furnace will be equipped with an automatic control system which will initiate a controlled shut down of fuel feeding to the furnace in the following circumstances: whenever the temperature of 850oC cannot be maintained; whenever the continuous emission monitors show that any emission limit value is exceeded due to disturbance or failure of the purification devices. Operational staff will be trained in the actions to take in the event of control system alarms being triggered.	Low	Low/medium – potential for increased air emissions	Not significant
Vandalism	Air/water/land	Various	The site is fenced and an electronic security gate is closed between 10 pm and 5 am. This gate is controlled from the security office which is manned 24/7. This gate can only be opened manually if the safety mechanism is disengaged. A second gate provides access to the Liberty Steel site. This gate remains locked unless required for access. This gate is unmanned. The rail gates are controlled from the security office. CCTV cameras are in operation. Security personnel carry out a perimeter check every few hours.	Low due to security measures in place	Low to Medium - depending on nature of the event. Potential contamination of local water course/air/land and/or local nuisance depending on nature of event.	Not significant, given the very low probability of any unauthorised access to the site
Flooding	River Usk, Severn Estuary, local reen system, structures on site; neighbouring land	Surface water drainage system	The majority of the site, including operational areas, is within a flood zone 2. The small areas immediately adjacent to the River Usk are within a flood zone 3. The area where the primary storage silos will be located are outside the flood zone. The storage facilities for reagents and fuels are designed to ensure all materials are contained and in the event of a flood, materials would not be released. As part of the site's emergency procedures, the appropriate procedures for responding to, reporting and investigation in the event of a flood will be assessed.	Very low	Medium Potential contamination of flood waters.	Not significant

3 EMISSIONS TO AIR

3.1 Overview

3.1.1 This section provides the relevant screening assessments of point source emissions to air that could arise from operation of SUP conversion. The assessment has been completed in accordance with the EA's risk assessments for your environmental permit[1].

3.1.2 The scope of the assessment has covered the following aspects:

- Release point characteristics;
- Air emissions inventory and mass flows;
- Emissions screening for further assessment;
- Photochemical Ozone Creation Potential (POCP).

3.1.3 Air emissions screening using the H1 software has identified a subset of emissions whose significance warrants further modelling. The results of that modelling for these and a range of other emissions are presented in the air quality report in Appendix H to the Supporting Information document.

3.2 Emissions release point

3.2.1 Point-source emissions to air from the facility will be from the single existing 122 m stack, at an efflux velocity of 9.9 m/s, and a normalised volumetric flow rate of 1,029,600 m^3/hr when both units are operating at capacity.

3.2.2 The H1 screening assessment has considered both long-term and short-term emissions at limits agreed with NRW as set out in table 4.1 of the supporting information document.

3.3 Emissions screening

3.3.1 Estimated emissions have been screened for significance against appropriate environmental standards for long-term and short-term exposure. Emissions standards are based on statutory air quality limits where available, and upon human health protection Environmental Assessment Levels (EALs) as given in H1 guidance.

3.3.2 Modelled concentrations have been included based on the data presented in the Air Quality Assessment (Appendix H of the supporting information document).

3.3.3 Process contributions (PCs) have been calculated using atmospheric dispersion modelling, details of which are given in the Air Quality Assessment at Appendix H of the supporting information document. Emissions which are lower than 1% of the relevant emissions standard for long-term exposure and lower than 10% of the relevant limit for short-term exposure are screened out as insignificant. Figure 3-1 below shows the emissions screening. Nitrogen dioxide, cadmium, arsenic, manganese and nickel are all potentially significant.

Figure 3-1: Air Impact Screening Stage One

Air Impact Screening Stage One

Screen out Insignificant Emissions to Air

his page displays the Process Contribution as a proportion of the EAL or EQS. Emissions with PCs that are less than the criteria indicated may be screened rom further assessment as they are likely to have an insignificant impact.

Number	Substance	Long Term EAL µg/m3	Short Term EAL µg/m3	Long Term PC µg/m3	Long Term % PC of EAL %	Long Term > 1% of EAL?	Short Term PC µg/m3	Short Term % PC of EAL %	Short Term > 10% of EAL?
1	Sulphur Dioxide (24 H	-	125	1.19	-		4.21	3.36	No
2	Nitrogen Dioxide	40.0	200	1.71	4.26	Yes	14.4	7.16	No
3	Particulates (PM10) (	-	50.0	0.178	-		0.301	0.601	No
4	Cadmium and its com	0.00500	-	0.000301	6.00	Yes	0.0565	-	
5	Antimony and compo	5.00	150	0.00321	0.0641	No	0.0720	0.0480	No
6	Arsenic and compour	0.00301	-	0.00321	107	Yes	0.565	-	
7	Lead	0.501	-	0.00321	0.641	No	0.565	-	
8	Chromium, chromium	5.00	150	0.00321	0.0641	No	0.0720	0.0480	No
9	Copper dusts and mi	10.00	200	0.00321	0.0321	No	0.0720	0.0360	No
10	Manganese and com	0.151	1,500	0.00321	2.14	Yes	0.0720	0.00480	No
11	Nickel (total Ni compc	0.0201	-	0.00321	16.0	Yes	0.565	-	
12	Vanadium	5.00	1,000	0.00321	0.0641	No	0.0720	7.20	No
13	Hydrogen chloride	-	750	0.119	-		2.90	0.387	No
14	Hydrogen fluoride (as	16.0	160	0.0411	0.257	No	0.401	0.251	No
15	Carbon monoxide	-	10,000	1.78	-		11.7	0.118	No
16	Ammonia (human he	180	2,500	0.545	0.303	No	43.3	1.74	No
19	Mercury and compou	0.251	7.51	0.000301	0.121	No	0.00720	0.0961	No
20	Thallium and its comp	1.000	30.0	0.000301	0.0301	No	0.00720	0.0241	No

3.3.4 A second stage of screening assesses the predicted environmental concentration (PEC) against emissions limits. Assumed background concentrations are taken from the air quality modelling, details of which are given in the Air Quality Assessment at Appendix H of the supporting information document. PECs which are lower than 70% of the relevant long-term emissions standard and lower than 20% of the relevant short-term standard minus 2 * the background concentration are screened out as insignificant, as shown in Figure 3-2**Error! Reference source not found.** below. Those not screened out as insignificant are recommended for further detailed assessment. The results for arsenic is potentially significant. Detailed modelling has been carried out for all expected emissions, and the results are given in Appendix H of the supporting information document.

Figure 3-2: Air Impact Screening Stage Two

Air Impact Modelling Stage Two Screening

Identify need for Detailed Modelling of Emissions to Air

This page displays the Process Contributions in relation to the backgound pollutant levels and the EAL or EQS. You should use this information to decide whether to conduct detailed modelling. Note that releases that are insignificant are not shown as they are screened from further assessment.
Also complete this page if you have already done detailed modelling.

Number	Substance	Air Bkgrnd Conc. µg/m3	Long Term PC µg/m3	Long Term % PC of headroom (EAL - Bkgrnd)	Long Term PEC mg/m3	Long Term % PEC of EAL %	Long Term % PEC of EAL >=70?	Short Term PC µg/m3	Short Term % PC of headroom (EAL - Bkgrnd)	Short Term % PC of headroom >=20?
	e.g.	12								
2	Nitrogen Dioxide	23.1	1.71	10.1	24.9	62.0	No	14.4	9.30	No
4	Cadmium and its compounds (as Cd)	0.0014	0.000301	8.34	0.00171	34.0	No	0.0565	-	
6	Arsenic and compounds (as As)	0.00081	0.00321	146	0.00401	134	Yes	0.565	-	
10	Manganese and compounds (as Mn)	0.04594	0.00321	3.08	0.0492	32.8	No	0.0720	0.00480	No
11	Nickel (total Ni compounds in the PM10 fraction)	0.00499	0.00321	21.4	0.00819	41.0	No	0.565	-	

3.4 Photochemical Ozone Creation Potential

3.4.1 The photochemical ozone creation potential (POCP) has been calculated in accordance with the H1 guidance. Three substances emitted to air by the facility are identified as having the potential to form ozone: nitrogen dioxide, sulphur dioxide and carbon monoxide. The total POCP score for the facility is calculated as 7,779.14.

3.4.2 The facility will be controlled to ensure that agreed emission limits for the POCP pollutants are met; the supporting information document details the proposed measures for preventing and minimising the release of these pollutants and concludes that the proposed measures are BAT.

4 GLOBAL WARMING POTENTIAL

4.1.1 The global warming potential (GWP) has been calculated in accordance with the H1 guidance. The total GWP score of approximately 1,645,530 comprises direct carbon dioxide and nitrous oxide emissions from combustion of fuel pellets. As GWP excludes the biogenic carbon content, the GWP score for the design fuel spec of 50% biogenic would be approximately 871,695.

4.1.2 The GWP score for direct carbon dioxide emissions from combustion of the fuel pellets comes from an estimated annual tonnage of CO_2 of 1,547,674 tonnes based on burning 880,000 tonnes of fuel pellets for 8,760 hours. Note that half of this tonnage is comprised of biogenic CO_2, meaning the GWP score would be halved as in paragraph 4.1.1. In 2013, the SUP coal-fired power station burned 600,441.47 tonnes of coal, producing approximately 1,333,855 tonnes of CO_2, all of which is non-biogenic. The combustion of fuel pellets will therefore result in a GWP score that is less than two thirds of that of the previous coal-burning operation.

4.1.3 The direct releases from combustion of fuel pellets are consistent with BAT, which promotes maximising efficient burnout of the material and the conversion of its carbon content to carbon dioxide. These releases are therefore determined by the carbon content of the incoming fuel pellets and the desire to achieve BAT.

4.1.4 Supplementary burners are essential to ensure that the facility meets agreed limits for emissions at all stages of operation and their use is considered BAT. This has been excluded from the GWP calculations as expected usage of auxiliary fuel is uncertain. It should be noted that overall the GWP contributions from auxiliary fuel usage is not expected to be significant and would be small compared to the contribution from combustion of fuel pellets.

5 EMISSIONS TO WATER

5.1.1 There will be no changes to the emissions to surface water as a result of the proposed change in the fuel for the combustion units.

5.1.2 An assessment of these discharges has been undertaken using the H1 software tool to satisfy point 6 of the Regulation 61 Notice dated 9 May 2018.

5.1.3 There are three point source emissions to surface water from the site regulated by the environmental permit. W1a is surface water runoff from the ash storage area and discharges to the Severn Estuary, W1b is surface water runoff from the power plant area and also discharges to the Severn Estuary, and W2 is cooling water which discharges to the River Usk via Julian's Pill. The H1 screening assessment has been carried out using the average and maximum concentrations measured during the last year of operation of the plant, in 2016.

5.1.4 A monitoring programme that includes the full suite of relevant IED pollutants will be carried out after the proposed changes are completed in order to confirm that there will be no change to the discharges to surface water as a result of the variation.

5.2 H1 methodology

5.2.1 The H1 software tool encompasses three different modelling methodologies:

- Freshwater (River)
- TraC (Riverine)
- TraC (Estuary & Coastal)

5.2.2 The H1 methodology for Rivers and TraC Riverine waters applies a sequence of screening tests to establish the environmental effect of whether a discharge is considered insignificant. For discharges to freshwater and riverine water there are four screenings tests as follows:

- Test 1 screens out any substances as insignificant where the release concentration is less than 10% of the Environmental Quality Standard (EQS).
- Test 2 screens out any substances as insignificant where the Process Contribution (PC) is less than 4% of the EQS.
- Test 3 and Test 4 are only required where substances have not been screened out in Test 2. For releases where the screening criterion in Test 2 is exceeded, the predicted environmental concentration (PEC) shall be determined. To identify which releases may need more detailed modelling, the PEC shall be assessed in relation to the background pollutant levels and the Annual Average EQS (EQS-AA) and the Maximum Allowable Concentration (EQS-MAC).

5.2.3 The H1 methodology for TraC (Estuary & Coastal) applies a sequence of screening test tests to establish the environmental effect of whether a discharge is considered insignificant. For discharges to estuarine and coastal water there are five screenings tests as follows:

- Test 1 screens out any substances as insignificant where the release concentration is below the EQS.
- Test 2 checks whether the discharge is to the low water channel. If it is then the screening tests for freshwater (described above) should be used starting at test 2.
- Test 3 checks if the receiving waterbody has restricted dilution or dispersion. If it does, modelling will be required.
- Test 4 checks the discharge location is more than 50 m offshore.
- Test 5 can only be carried out if the discharge is buoyant. If it is this test screens out substances which the effective volume flux is within allowable limits.

5.3 W1a and W1b Discharge Assessment (TraC Riverine)

River Flow Rate

5.3.1 The applied river flow rate values are site specific and have been calculated from data obtained from the Centre for Ecology and Hydrology, from the National River Flow Archive. As there is no river flow provided for the Severn Estuary, NRW advised that the 95% exceedance (Q95) flow rates for the Usk at Chainbridge (4.61 m^3/s), the Wye at Redbrook (11.15 m^3/s) and the Severn at Deerhurst (18.6 m^3/s) could be combined to produce a Q95 flow rate of 34.36 m^3/s for the Severn Estuary to be used in the H1 tool for the W1a and W1b discharges[2].

Effluent Flow Rate

5.3.2 As the discharges at W1a and W1b consist of run off from the site they are rainfall dependant. Both discharges include rainwater run off from process areas. There are no constraints on the flow rate for either of these discharges within the permit and the discharge rate has not been monitored.

5.3.3 It has therefore been necessary to calculate a flow rate which has been done on the basis of the maximum flow rate that would be acceptable at the measured discharge concentrations.

5.3.4 The mean effluent flow rate of 0.0255 m^3/s and maximum effluent flow rate of 0.623 m^3/s have been applied to each discharge.

Permitted Emissions to Water

5.3.5 The emissions limits set out in the current permit are provided in Table 5.1 together with the measured concentrations from 2016, the last full year of operation of the plant.

Table 5.1. Point Source Emissions to Water - Permitted Emission Limits (Table S3.2) for W1a and W1b and Measured Concentrations from 2016

Emission Point	Parameter	Limit	Average measured in 2016	Maximum measured in 2016
W1a	Total suspended solids	75 mg/l	13.9 mg/l	24 mg/l
	pH	6-9	8.15	8.9
	Cadmium	0.01 mg/l	0.006 mg/l	0.006 mg/l
	Mercury	0.005 mg/l	0.001 mg/l	0.001mg/l
W1b	Total suspended solids	75 mg/l	9.6 mg/l	18 mg/l
	pH	6-9	8.21	8.5
	Cadmium	0.01 mg/l	0.006 mg/l	0.006 mg/l
	Mercury	0.005 mg/l	0.001 mg/l	0.001 mg/l

5.3.6 The H1 screening tool has been used to assess the discharges, however only those contaminants included in the H1 database have been considered in this assessment. Some controlled parameters in the discharges cannot be assessed using the chemical specific assessment approach in H1, these are discussed in turn below:

5.3.7 pH – the pH assessment in the H1 tool was not applicable for this assessment as the measured pH values collected at the site are spot measurements rather than continuous and therefore the pH values at the various flow rates (high normal rate, high peak rate, low normal rate, low peak rate) cannot be distinguished for use. The measured pH for 2016 indicates that the SUP

[2] Email from Owain Sheppard (NRW) to Frances Bodman (RPS) dated 12/11/2019.

installation can comply with the existing permit limit of pH 6 – 9. Given the low flow rate into the Severn Estuary pH is not expected to have an impact on the receiving water body.

5.3.8 Total suspended solids (TSS) – The measured concentrations are much lower than the permitted limits for TSS. TSS is not a priority hazardous substance for discharges to surface water, it will not have an effect on the toxicity of the water and so has not been included in the assessment.

Results

5.3.9 EQSs, as given in H1, have been used to screen out any insignificant pollutants. For cadmium. the EQSs are expressed as EQS-AA and EQS-MAC, while for mercury only the EQS-MAC is used. For all pollutants, the average measured concentration for 2016 was assessed against the EQS-AA and the maximum measured concentration for 2016 was assessed against the EQS-MAC.

Test 1

5.3.10 None of the pollutants in the discharges from W1a and W1b are released at <10% of the EQS. Therefore, no pollutants are screened out by Test 1.

Test 2

5.3.11 PCs are calculated for the relevant surface water type (i.e. TraC Riverine) for each discharge assessed. None of the pollutants are screened out by Test 2 as none of the calculated PCs are <4% of the EQS.

Tests 3 and 4

5.3.12 PECs are determined for each emission assessed and Tests 3, 4a and 4b are applied. Any substances that pass all 3 of these tests can be screened out. Substances failing any of the tests require further assessment. As detailed in H1 guidance, the estimated background concentrations are assumed to be 50% of the EQS. Table 5.2 shows the calculated PECs of the assessed pollutants for discharges W1a and W1b, as well as PEC as a proportion of the background pollutant levels and the AA or MAC EQS.

Table 5.2. Pollutant screening for W1a and W1b

Pollutant	Background Concentration (μg/l)	PEC (μg/l)	(PEC-BC)/EQS (%)	Test 3 PEC-BC >10% AA EQS	%PEC of EQS	Test 4a PEC >100% AA EQS	%PEC of MAC	Test 4b PEC >100% MAC
Cadmium	0.045	0.0539	9.9	Pass	59.9	Pass	42.5	Pass
Mercury	0.035	0	-	Pass	-	Pass	100	Pass

5.3.13 As shown in Table 5.2, the pollutant releases pass all three tests and therefore further assessment is not required for the releases from W1a and W1b.

5.3.14 As stated above the maximum allowable flow rates have been calculated in order for the concentrations to pass the H1 screening test. This is therefore a conservative assessment with actual flow rates expected to be lower than those used in this assessment.

5.4 W2 Discharge Assessment

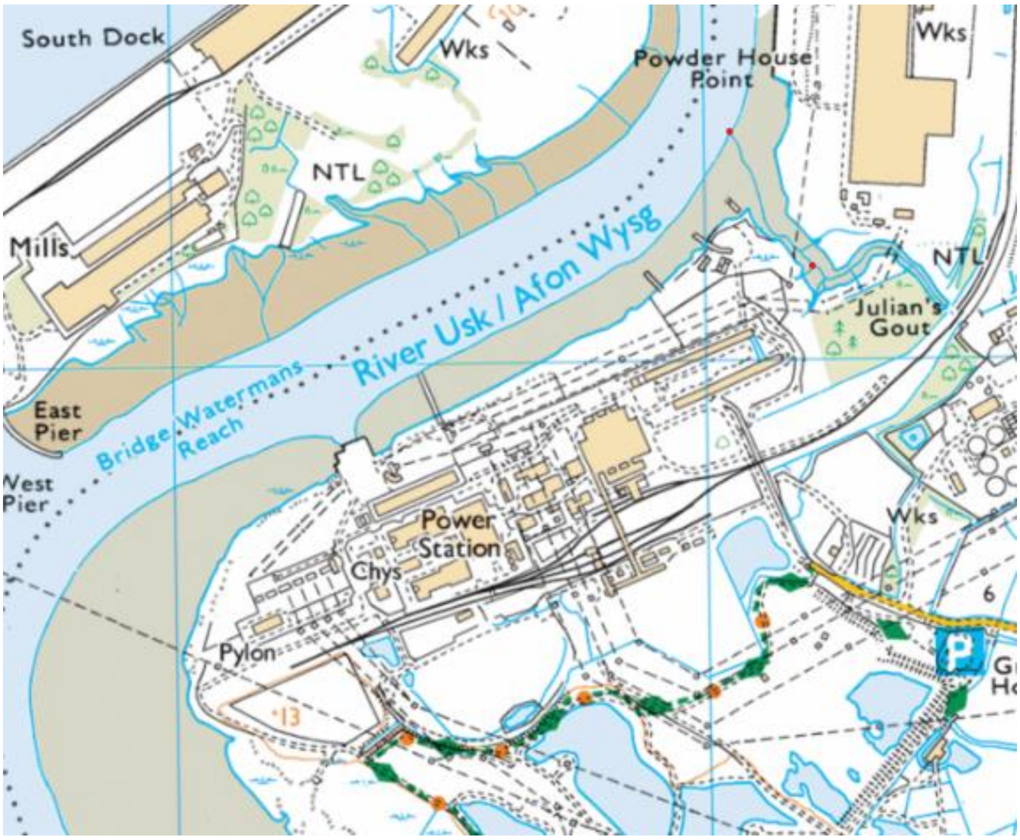
5.4.1 The W2 discharge comprises water that has come from the Nash sewage treatment works (STW) and which is then used in the cooling process at the SUP installation. No new pollutants of concern are added to water during the cooling process. It is possible that some metals leach from the condensers during the cooling process thereby increasing the concentrations above the input water. In addition, evaporation during the cooling process means the concentrations in the water will be higher coming out of the SUP installation than they were coming in from the STW but this would not be reflective of the increase in the overall load being emitted.

5.4.2 Julian's Pill itself is a heavily modified watercourse with little natural flow. The continuous nature of the flow is due to the permitted discharge from the STW.

5.4.3 Due to the nature of the receiving water course the H1 tool does not provide a suitable model for this assessment.

5.4.4 The discharge has been assessed at two separate points using both the TraC Riverine model for Julian's Pill and the TraC Estuarine model for the Usk. The points are indicated by red dots on the OS Map in Figure 5-1 below:

Figure 5-1: OS Map W2 Discharge



5.4.5 As can be seen from the OS Map at Figure 5-1 the mean high water level encompasses Julian's Pill to a point further in land than the discharge from the SUP site. In addition, data from the Newport Monitoring Station indicates that in average weather conditions the normal water level is between 0.22 m and 13.28 m [3].

5.4.6 The SUP site benefits from flood defences and is artificially raised, with OS indicating a level of 13 m at the western edge of the site. From this we can infer that levels of natural ground further inland would be lower than 13 m.

5.4.7 These factors point towards the discharge point for W2 being a predominantly saline environment and therefore it is considered that the TraC Estuarine assessment is the most appropriate.

5.4.8 Both assessments are presented below.

Scenario 1 – Discharge into Julian's Pill (TraC Riverine)

5.4.9 A Q95 flow rate of 0.093 m^3/s was used for Julian's Pill, as advised by NRW[4].

[3] https://riverlevels.uk/newport-gwent-tidal-level#.XfOdRnd2spE

[4] Email from David Poole to Frances Bodman (RPS) and Cara Donovan (SUP) dated 11/12/2019

Scenario 2 – Discharge into the River Usk (TraC Estuary and Coastal)

5.4.10 A flow rate is not required for a TraC Estuary and Coastal Release. The information required for this assessment is described in paragraphs 5.4.28 and 5.4.30.

Effluent Flow Rate

5.4.11 The mean effluent flow rate of 0.032 m^3/s and maximum effluent flow rate of 0.038 m^3/s that were measured in 2016 have been applied to the W2 discharge.

Permitted Emissions to Water

5.4.12 The emissions limits set out in the current permit are provided in Table 5.3 together with the measured concentrations from 2016, the last year of operation of the plant.

Table 5.3 Point Source Emissions to Water - Permitted Emission Limits (Table S3.2) for W2 and Measured Concentrations from 2016

Emission Point	Parameter	Limit	Average measured in 2016	Maximum measured in 2016
W2	Total suspended solids	150 mg/l	42 mg/l	92 mg/l
	pH	6-9	7.36	7.8
	Temperature	30 °C	19.2 °C	26 °C
	Biological Oxygen Demand	100 mg/l	2.67 mg/l	6 mg/l
	Zinc	2 mg/l	0.124 mg/l	0.173 mg/l
	Copper	0.8 mg/l	0.115 mg/l	0.162 mg/l
	Nickel	0.4 mg/l	0.104 mg/l	0.155 mg/l
	Lead	0.8 mg/l	0.030 mg/l	0.292 mg/l
	Chromium	0.8 mg/l	0.104 mg/l	0.77 mg/l
	Flow	19,872 m^3/day or 210 l/s max	0.032 m^3/s	0.038 m^3/s
	Cadmium	0.01 mg/l	0.0006 mg/l	0.0006 mg/l
	Mercury	0.005 mg/l	0.00011 mg/l	0.00013 mg/l

5.4.13 The H1 screening tool has been used to assess the discharge from W2 as specified in Table 5.3 above, however only those contaminants included in the H1 database have been considered in this assessment.

5.4.14 Some controlled parameters in the discharge cannot be assessed using the chemical specific assessment approach in H1, these are discussed in turn below:

5.4.15 pH – The pH assessment in the H1 tool was not applicable for this assessment as the measured pH values collected at the site are spot measurements rather than continuous and therefore the pH values at the various flow rates (high normal rate, high peak rate, low normal rate, low peak rate) cannot be distinguished for use. Given that pH adjustment forms part of the on-site effluent treatment, and with the low discharge flow rate, it is expected that the SUP installation can comply with the existing permit limit of pH 6 – 9.

5.4.16 Total suspended solids (TSS) – The measured concentrations are much lower than the permitted limits for TSS. TSS is not a priority hazardous substance for discharges to surface water, it will not have an effect on the toxicity of the water and so has not been included in the assessment.

5.4.17 Temperature – Temperature has been assessed in Scenario 1 (see paragraph 5.4.19), but as a flow rate is not used for the TraC (Estuary & Coastal) scenario (Scenario 2), the temperature assessment in the H1 tool is not applicable. However, the The maximum temperature recorded is below the permitted limit for temperature and is therefore considered acceptable.

5.4.18 Biological oxygen demand (BOD) - The measured concentrations are much lower than the permitted limits for BOD. BOD is not a priority hazardous substance for discharges to surface water, it will not have an effect on the toxicity of the water and so has not been included in the assessment.

Results Scenario 1 (TraC Riverine)

5.4.19 The maximum permitted temperature of 30°C was assessed in the H1 tool for W2. This produced a maximum temperature difference of 10.3°C, which does not screen out against the benchmark of 2°C.

5.4.20 EQSs, as given in H1, have been used to screen out any insignificant pollutants. For cadmium. nickel, lead and chromium the EQSs are expressed as EQS-AA and EQS-MAC, for zinc and copper only the EQS-AA are used and for mercury only the EQS-MAC is used. For all pollutants, the average measured concentration for 2016 was assessed against the EQS-AA and the maximum measured concentration for 2016 was assessed against the EQS-MAC, where applicable.

Test 1

5.4.21 None of the pollutants in the process discharges are released at <10% of the EQS. Therefore, no pollutants are screened out by Test 1.

Test 2

5.4.22 PCs are calculated for the relevant surface water type (i.e. TraC Riverine) for each emission assessed, according to the release point parameters. None of the pollutants are screened out by Test 2 as none of the calculated PCs are <4% of the EQS.

Tests 3 and 4

5.4.23 PECs are determined for each emission assessed, according to the release point parameters, and Tests 3, 4a and 4b are applied. Any substances that pass all 3 of these tests can be screened out. Substances failing any of the tests must be modelled. As detailed in H1 guidance, the estimated background concentrations are assumed to be 50% of the EQS. Table 5.4 shows the calculated PECs of the assessed pollutants for W2, as well as PEC as a proportion of the background pollutant levels and the AA or MAC EQS.

Table 5.4. Pollutant screening for W2

Pollutant	Background Concentration (µg/l)	PEC (µg/l)	(PEC-BC)/EQS (%)	Test 3 PEC-BC >10% AA EQS	%PEC of EQS	Test 4a PEC >100% AA EQS	%PEC of MAC	Test 4b PEC >100% MAC
Zinc	3.4	35.2	291.2	Fail	322	Fail	-	Pass
Copper	1.88	31.4		Fail	3,132	Fail	-	Pass
Nickel	4.3	31	665.6	Fail	773	Fail	145	Fail
Lead	0.65	8.34	640	Fail	694	Fail	610	Fail
Chromium VI	0.3	27	783.1	Fail	792	Fail	-	Pass
Cadmium	0.1	0.254	170.7	Fail	282	Fail	45.7	Pass
Mercury	0.035	-	-	Pass	-	Pass	104	Fail

5.4.24 As shown in Table 5.4, the pollutant releases do not pass all three tests.

Results Scenario 2 (TraC Estuary & Coastal)

Test 1

5.4.25 None of the pollutants in the process discharges are released at <10% of the EQS. Therefore, no pollutants are screened out by Test 1.

Test 2

5.4.26 In reality the discharge is to Julian's Pill rather than the Usk and it is likely that Julian's Pill discharges to the low water channel. However, for the purposes of this assessment we have assumed that the discharge is not direct to the low water channel. Test 2 only applies to TraC Riverine waters and not to TraC Estuary & Coastal waters.

Tests 3 – 5

5.4.27 The H1 assessment tool provides three criteria for discharges to be assessed using the TraC estuarine version of the assessment:

- is the discharge to a location with restricted dilution / dispersion characteristics?
- is the discharge to a location less than 50 m offshore or to a location where the sea bed is less than 1m below?
- is the discharge negatively buoyant?

5.4.28 As the discharge is into Julian's Pill rather than the Usk itself it does not discharge at a location more than 50 m offshore. However, as described in sections 5.4.5 to 5.4.7 above it is considered that this is the most appropriate assessment.

5.4.29 The mean effluent flow rate of 0.032 m^3/s and maximum effluent flow rate of 0.038 m^3/s that were measured in 2016 have been assessed against the AA-EQS and MAC-EQS respectively.

5.4.30 A TraC estuarine water release depth below chart datum of 2 m has been applied. Table 5.5 shows the results of Test 5 where the allowable effective volume flux (Allowable EVF) is calculated and compared with the effective volume flux (EVF).

Table 5.5. Effective Volume Flux - Test 5 for TraC Estuarine Water Releases

Pollutant	Background Concentration (µg/l)	Annual Avg EQS			MAC EQS			Allowable EVF	Test 5
		Release conc (µg/l)	EQS-AA	EVF	Release conc (µg/l)	EQS-MAC	EVF (MAC)		
Zinc	3.4	124	10.9	0.53	-	-	-	2	Pass
Copper	1.88	115	1	-4.18	-	-	-	2	Pass
Nickel	4.3	104	4	-11.09	155	34	0.2	2	Pass
Lead	0.65	30	1.2	1.75	292	14	0.83	2	Pass
Chromium VI	0.3	104	3.4	1.07	770	-	-	2	Pass
Cadmium	0.1	0.6	0.09	-1.92	0.6	0.6	0.05	2	Pass
Mercury	0.035	-	-	-	0.13	0.07	0.14	2	Pass

5.4.31 As shown in Table 5.5, the pollutant releases pass the TraC estuarine water release tests and therefore further assessment is not required for these pollutants.

6 CONCLUSIONS

6.1.1 The environmental risk assessment (ERA) has been undertaken to assess the likelihood of risk from amenity and accidents, air emissions and global warming potential associated with the SUP facility and in particular the proposed change of the fuel, from coal and biomass to fuel pellets and biomass, for the main combustion activity.

6.1.2 The results of the ERA have shown that the risk of odour, noise and vibration, fugitive emissions, visible plumes, and accidents ranges from ‘not significant’ to ‘low’.

6.1.3 Stack emissions to air for some air pollutants have not been screened out to be insignificant. Consequently, detailed dispersion modelling has been carried to demonstrate no significant effects from emissions to air from the SUP facility. A copy of this assessment is provided in Appendix H of the supporting information document.

6.1.4 There will be no process emissions to land from the SUP facility and there will be no change to the point source emissions to water and sewer as a result of the proposed permit variation.

6.1.5 An assessment of the three point source emissions to surface water have been carried out using the H1 software tool. The W1a and W1b discharges to the Severn Estuary screen out and the W2 discharge to the River Usk (TraC Estuarine release) also screens out from further assessment.

6.1.6 The POCP for the SUP facility is calculated as 7,779. The use of BAT to control emissions, as set out in the supporting information document, minimises the POCP from the facility.

6.1.7 The total GWP score of approximately 871,695 is contributed by direct carbon dioxide and nitrous oxide emissions from the combustion of the fuel pellets (note: GWP excludes fossil-derived carbon dioxide).

GLOSSARY

AOD	Above Ordnance Datum
APC	Air Pollution Control
BAT	Best Available Techniques
EfW	Energy from Waste
EQS	Environmental Quality Standard
ERA	Environmental Risk Assessment
EVF	Effective Volume Flux
GWP	Global Warming Potential
IBA	Incinerator Bottom Ash
IED	Industrial Emissions Directive
MAC	Maximum Allowable Concentration
PC	Process Contribution
PEC	Predicted Environmental Concentration
POCP	Photochemical Ozone Creation Potential
RDF	Refuse Derived Fuel (Feedstock/fuel pellets)
SNCR	Selective Non-Catalytic Reduction
TraC	Transitional and Coastal
VOC	Volatile Organic Compounds

APPENDICES

Appendix A

H1 Assessment