FICHTNER
Consulting Engineers Limited

Lostock Sustainable Energy Plant Ltd

Lostock Sustainable Energy Plant

Addendum to Appendix B – Review of Operating Techniques

1 Introduction

An application for a variation to the Environmental Permit (EP) (Ref: WP3934AK) for the Lostock Sustainable Energy Plant (LSEP or the Facility) was submitted by LSEP Ltd on 14 February 2022.

As part of the EP variation application, a number of changes to the operating techniques in Table S1.2 of the EP were proposed. These were provided in Appendix B of the Supporting Information (Ref: S3291-0320-0001KLH).

Since the EP variation submitted, further detailed design of the Facility has been undertaken, in addition to a comprehensive review of the original EP application sections which make up the operating techniques in the EP. As a result of this, there are some additional changes which are required to be made to the operating techniques in the EP. This was discussed with the permitting officer allocated to the EP variation application for Duly Making, who agreed that an addendum to the application could be provided. Accordingly, this document is provided as an addendum to Appendix B of the Supporting Information to the EP variation application. The proposed additional changes to the Operating Techniques are set out in Table 1.

Table 1: Additional changes to operating techniques

Permit reference	Original EP application reference	Operating technique	Proposed revision to the operating technique	Comment
Table S1.2 Application	Non-technical summary Process description	It is intended that waste will be delivered by a combination of road and rail.	It is intended that waste will be delivered by road. If the potential for delivery by rail is realised during the development of the project, this will be further assessed.	-
Table S1.2 Application	Non-technical summary Process description	Inside the plant building, waste will be discharged directly into the waste bunker, which has two main areas separated with a permanent barrier. The front section forms the collection bunker into which the waste fuel will be tipped. Behind the collection bunker is the larger stacking bunker section. This design provides a more efficient use of space to provide the necessary storage. The combined capacity equates to approximately 10,000 tonnes of waste material. Waste is transferred by crane from the collection bunker to the stacking bunker.	Inside the plant building, waste will be discharged directly into the waste bunker. The capacity of the waste bunker will be approximately 4,500 tonnes of waste.	It is now only proposed for there to be a single bunker, which will not be split into sections. The waste storage capacity of the bunker has been refined following further design.
Table S1.2 Application	Non-technical summary Process description	This is achieved by maximising the re-use of process waters and through the collection of rainwater. Under normal operation there will be no process water discharges. During heavy rainfall where the rate of generation exceeds process demands excess rainwater will be	This is achieved by maximising the re-use of process waters. Under normal operations, there will be no process water discharges. Furthermore, rainwater would be collected and used e.g. in welfare facilities. During periods of heavy rainfall where the rate of generation	Harvested rainwater will not be used as process water, but would instead be used for e.g. welfare facilities.

Permit reference	Original EP application reference	Operating technique	Proposed revision to the operating technique	Comment
		discharged to surface water via the existing consented discharge.	exceeds the capacities of storage facilities, excess rainwater will be discharged to surface water.	
Table S1.2 Application	Non-technical summary Process description	In the unlikely event of a full plant shutdown air from above the bunker will be extracted and vented to air via a carbon filter	The plant will be of a two-stream design, with maintenance of each line undertaken in succession. Therefore, it is very unlikely for both lines to be shut down at the same time. Odour will be controlled during shutdown periods by minimising the amount of waste in storage. Waste will be run-down prior to periods of planned maintenance. In addition, doors to the tipping hall will be kept shut during periods of shutdown.	There will be no additional carbon filtration system – instead, odour will be managed by undertaking maintenance of each line in succession. This is a standard practice / design for twin-stream UK energy from waste plants.
Table S1.2 Application	Non-technical summary Management of activities	EEW have established integrated management systems at existing operational plant and it is anticipated that a similar system will be adopted (and modified as necessary) at the SEP. The system will also be designed to be complementary to other management systems within the soda ash process at the Lostock site.	The Plant Operator has established integrated management systems at existing operational plants and it is anticipated that a similar system will be adopted (and modified as necessary) at the SEP.	This paragraph refers to the previous owners of the project.
Table S1.2 Application	Non-technical summary Waste	The air pollution control residues will be sent to landfill. EEW will regularly review the disposal option for this residue and if a recycle route becomes viable then the residue will be diverted for recycling.	The air pollution control residues will either be sent to landfill or to a suitably licensed processing facility for recycling. The Operator will regularly review the disposal options for this residue and if a	To reflect potential options for recycling of APCr, and change in Operator name.

Permit reference	Original EP application reference	Operating technique	Proposed revision to the operating technique	Comment
			recycle route becomes viable then the residue will be diverted for recycling.	
Table S1.2 Application	Non-technical summary Impacts	These assessments have considered the effects from operation of both lines (phase 2) of the SEP development. Effects from phase one will have lower impacts.	These assessments have considered the effects from operation of both lines of the SEP development.	It is no longer proposed to develop the project in two 'phases'. The full plant will be developed in only one phase.
Table S1.2 Application	Section 2.1 Management of activities	-	-	EEW is to be replaced with 'The Operator'. The 'organisation chart' provides an indicative management structure, but this is subject to detailed design of the Facility.
Table S1.2 Application	Section 2.3 Energy efficiency	The selected fuel comprises treated non-hazardous wastes and will replace energy currently generated from natural gas.	The selected fuel comprises non-hazardous wastes and will replace energy currently generated from natural gas.	A number of non-hazardous waste codes are listed in the permit (i.e. not just pre-treated RDF).
Table S1.2 Application	Section 2.3 Energy efficiency	Although not burning raw MSW the requirements for MSW facilities are appropriate to the Lostock SEP proposals.	*Remove*	The plant may burn 'raw' MSW depending on the source of the waste.
Table S1.2 Application	Section 2.3 Energy efficiency	The proposed SEP has been located adjacent to the soda ash process at Lostock allowing steam produced from the SEP to be used to supply heat to the soda ash operations and also for the production of electricity to export to the grid thereby achieving a high level of energy recovery. The proposals therefore are considered to be BAT for energy efficiency for facilities burning waste	Energy is recovered from the hot flue gases within the steam boiler. The resulting high pressure steam is directed to the turbine, generating electricity which is exported to the grid. The Facility will also have the potential to export heat to local users should this become commercially and technically viable. The proposals therefore are considered to be BAT for energy efficiency for facilities	To reflect changes to heat export arrangements, as put forward in the variation application. This paragraph should have been adjusted in the previous review of the operating techniques (Appendix B of the supporting information to the EP variation).

Permit reference	Original EP application reference	Operating technique	Proposed revision to the operating technique	Comment
		achieving a high overall energy efficiency as detailed in the previous section.	burning waste achieving a high overall energy efficiency.	
Table S1.2 Application	Section 2.4 Efficient use of raw materials and water	The primary driver for the plant is to ensure future power security by moving away from the existing reliance on fossil fuel generation. The proposals therefore intend to accept the following waste materials: • Solid Recovered Fuel (SRF); • Treated Municipal Solid Waste (MSW); and • Commercial and Industrial (C&I) Waste.	The primary driver for the plant is to ensure future power security by moving away from the existing reliance on fossil fuel generation. The proposals therefore intend to accept the following waste materials: • Solid Recovered Fuel (SRF); • Municipal Solid Waste (MSW); and • Commercial and Industrial (C&I) Waste.	To reflect both treated and non-treated MSW, depending on the source of the waste.
Table S1.2 Application	Section 2.4 Efficient use of raw materials and water	An intermediate process water tank of circa 80m3 capacity will be provided	Waste process water will be stored in a tank with a capacity of approximately 400 m^3, fresh process water storage will be approximately 700 m^3, and demineralised water storage will be approximately 300 m^3.	To reflect further detailed design of water balance.
Table S1.2 Application	Section 2.4 Efficient use of raw materials and water	The process water will be used solely in the slag extractor	The process water will be used primarily within the ash quench.	To allow for other minor potential uses of process water following detailed design.
Table S1.2 Application	Section 2.4	The rain water storage reservoir will have a capacity of 500m^3 and will top-up the	The rainwater storage reservoir will have a capacity of 14 m^3 and this water will generally be used within the administration building. A connection	Further detailed design has shown limited space underground for rainwater storage. Therefore, the size of the rainwater storage reservoir has reduced,

<table>
<tr><th>Permit reference</th><th>Original EP application reference</th><th>Operating technique</th><th>Proposed revision to the operating technique</th><th>Comment</th></tr>
<tr><td></td><td>Efficient use of raw materials and water</td><td>process tank in preference to top-up from fresh water.</td><td>from the rainwater storage reservoir will be made to the main process water treatment tank (c. 400 m^3 total capacity) in case there is a high demand of recycled process water and high rainfall.</td><td>but the capacity of the waste process water tank has increased to 400 m^3 (see above).</td></tr>
<tr><td>Table S1.2 Application</td><td>Section 2.4 Efficient use of raw materials and water</td><td>In the event of a fire, fire water would be supplied from the Tata Chemicals Lostock site fire water system. This system has a capacity of circa 3,000 m^3.</td><td>In the event of a fire, fire water would be supplied from a dedicated firewater tank with duty/standby diesel driven fire pumps. The firewater tank will have a capacity of approximately 1400 m^3</td><td>To reflect changes to fire water supply following detailed design.</td></tr>
<tr><td>Table S1.2 Application</td><td>Section 2.4 Efficient use of raw materials and water</td><td>Firewater containment will be provided as summarised in Table 2.3. The total available capacity will be 5,030 m^3. It is expected that the available storage capacity will provide sufficient containment for foreseeable fire events.
<table>
<tr><th>Fire water containment structure</th><th>Capacity (m^3)</th></tr>
<tr><td>Waste bunker</td><td>4,063</td></tr>
<tr><td>Bottom Ash bunker</td><td>579</td></tr>
<tr><td>Boiler house</td><td>103</td></tr>
<tr><td>Steam turbine building</td><td>46</td></tr>
<tr><td>Flue gas treatment plant</td><td>169</td></tr>
</table></td><td>Sufficient firewater containment will be provided – the site will be designed to collect fire water during a fire on site so that it can be tested prior to disposal.</td><td>Exact storage capacities are subject to detailed design and can be provided to the EA via a pre-operational condition or similar.</td></tr>
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<tr><td></td><td></td><td><table><tr><td>Road way drainage system (would be sealed off in the event of a fire to contain firewaters)</td><td>70</td></tr></table></td><td></td><td></td></tr>
<tr><td>Table S1.2 Application</td><td>Section 2.4 Efficient use of raw materials and water</td><td><table><tr><th>Raw material</th><th>Storage including capacity</th></tr><tr><td>Incoming waste</td><td>22,000m^3 max. (equates to approximately 10,000 tonnes)</td></tr><tr><td>Ammonium hydroxide</td><td>50 m^3 GRP storage tank</td></tr><tr><td>Powder Activated Carbon</td><td>2 x 45 m^3 storage tank with level control to prevent overfilling</td></tr><tr><td>Light Fuel Oil</td><td>150 m^3</td></tr><tr><td>Sodium bicarbonate</td><td>2 x 200 m^3</td></tr><tr><td>Water</td><td>Supply from Winnington CHP</td></tr></table></td><td><table><tr><th>Raw material</th><th>Storage including capacity</th></tr><tr><td>Incoming waste</td><td>4.1 days (c. 9000 tonnes)</td></tr><tr><td>Ammonium hydroxide</td><td>76 m^3</td></tr><tr><td>Powder Activated Carbon</td><td>80 m^3</td></tr><tr><td>Light Fuel Oil</td><td>2 x 90 m^3 bunded tanks</td></tr><tr><td>Sodium bicarbonate</td><td>2 x 111 m^3</td></tr><tr><td>Water</td><td>Raw water: 700 m^3, demineralised water: 300 m^3
Fire water: c. 1400 m^3</td></tr></table></td><td>Updated estimates for annual consumption have been provided in the supporting document to the EP variation. However, the storage capacities have also changed since the original EP was granted, and this should be reflected/updated in the operating techniques.</td></tr>
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<tr><th>Permit reference</th><th>Original EP application reference</th><th>Operating technique</th><th>Proposed revision to the operating technique</th><th>Comment</th></tr>
<tr><td>Table S1.2 Application</td><td>Section 2.5 Avoidance, Recovery and Disposal of Wastes</td><td><table><tr><th>Waste</th><th>Storage</th></tr><tr><td>Bottom Ash (including boiler ash, but excluding metals, see below)</td><td>Ash handling building (see Figure 3c)</td></tr><tr><td>Air Pollution Control Residues</td><td>4 x 250 m^3 APC storage silos.</td></tr><tr><td>Ferrous metals</td><td>Open container within ash processing plant</td></tr><tr><td>Non-ferrous metals</td><td>Open container within ash processing plant</td></tr></table></td><td><table><tr><th>Waste</th><th>Storage</th></tr><tr><td>Bottom Ash (including boiler ash, but excluding metals, see below)</td><td>Ash handling area (Appendix A)</td></tr><tr><td>Air Pollution Control Residues</td><td>2 x 440 m^3 silos</td></tr><tr><td>Ferrous metals</td><td>Remove</td></tr><tr><td>Non-ferrous metals</td><td>Remove</td></tr></table></td><td>Updated estimates for annual generation (in addition to removing references to ferrous and non-ferrous metals) have been included in the supporting document to the EP variation. However, the storage capacities have also changed since the original EP was granted, and this should be reflected/updated in the operating techniques.</td></tr>
<tr><td>Table S1.2 Application</td><td>Section 2.5 Avoidance, Recovery and Disposal of Wastes</td><td>The bottom ash will undergo size reduction (crushing) and grading. The graded material is then transferred from the bottom ash processing plant by road and matured within the bottom ash conditioning building. During conditioning, dampening of the ash is required. Water required for this process will be supplied from any run-off from the bottom ash during storage.
Conditioning of the bottom ash takes approximately 3 months and aims to achieve a stabilised non-hazardous waste</td><td>Remove.</td><td>As proposed in the EP variation application, on-site ash processing is no longer proposed at the site. This paragraph was accidentally missed in the previous review of the operating techniques (Appendix B of the supporting information to the EP variation).</td></tr>
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		product which is suitable for re-use. As part of the bottom ash conditioning process, the bottom ash absorbs/sequesters CO2. Research has shown that the bottom ash can sequester up to 3.2% of its dry mass.		
Table S1.2 Application	Section 3.1 Incoming waste and raw material management	The plant will receive appropriately pre-treated waste materials by conventional road vehicles and rail	The plant will receive waste by road. If the potential for delivery by rail is realised during the development of the project, this will be further assessed.	-
Table S1.2 Application	Section 3.1 Incoming waste and raw material management	Rail deliveries will be pre-weighed and containers will be off-loaded at the rail reception facilities located to the west of the site adjacent to the bottom ash handling plant. The incoming rail containers will be transferred to the waste reception hall by shunt vehicles.	Remove.	At this stage, it is expected that the majority of waste deliveries will be received via rail. If the potential for delivery by rail is realised during the development of the project, this will be further assessed.
Table S1.2 Application	Section 3.1 Incoming waste and raw material management	The bunker arrangement takes the form of a rectangular pit set down in to the floor of the reception area. It will have a depth of up to 7 metres below the general floor level of the plant. The bunker has two main areas. The first, the collection bunker into which the waste fuel will be tipped from the containerised vehicles will have a capacity of 3,456 m3. A permanent	The bunker will take the form of a rectangular pit set down in to the floor of the reception area. It will have a depth of up to 12 metres below the general floor level of the plant. The capacity of the bunker will be approximately 9,000 tonnes of waste.	It is now only proposed for there to be a single bunker, which will not be split into sections. The dimensions and waste storage capacity of the bunker has been refined following further design.

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		barrier provides separation from a larger adjacent stacking bunker which has a capacity of 18,221 m3. The combined capacity equates to approximately 10,000 tonnes of waste material. Waste fuel in the bunker will be regularly mixed to promote a homogenous feed to the plant. Waste fuel is transferred from the collection bunker to the storage by the use of two hydraulic grabs. Here the waste is mixed to provide for a regular quality and is fed to the charging hoppers which in turn feed the grate stoker furnace located within the boiler house.		
Table S1.2 Application	Section 3.1 Incoming waste and raw material management	The crane grab size has been selected at approximately 10m^3 capacity.	The crane grab size has been selected at approximately 20 m^3 capacity.	
Table S1.2 Application	Section 3.1 Incoming waste and raw material management	A complete shutdown of both lines is expected to be a rare event as planned maintenance will be carried out on only one line at a time. In the event of both lines being shut down air from above the bunker will be extracted via an activated carbon filter to abate any potential odours.	A complete shutdown of both lines is expected to be a rare event as planned maintenance will be carried out on only one line at a time. In the unlikely event of a full plant shutdown, all doors/louvres will be kept closed to minimise the potential for fugitive odour emissions. Furthermore, odour will be controlled during shutdown periods by minimising	

Permit reference	Original EP application reference	Operating technique	Proposed revision to the operating technique	Comment
			the amount of waste in storage. Waste will be run-down prior to periods of planned maintenance.	
Table S1.2 Application	Section 3.1 Incoming waste and raw material management	Auxiliary fuel for the proposed plant will be low sulphur light fuel oil and will be stored in a 150 m^3 double skinned above ground storage tank.	Auxiliary fuel for the proposed plant will be low sulphur light fuel oil (or equivalent) and will be stored in 2 x 90 m^3 tanks. The tanks will be single skinned tanks which are bunded and comply with the requirements of CIRIA C736.	
Table S1.2 Application	Section 3.1 Incoming waste and raw material management	The filter unit will be visually inspected during unloading operations to ensure that it is operating effectively. These inspections will be recorded in the event of a dust emission the filter will be replaced.	The unit will be equipped with a dust detection system, which will monitor emissions during unloading operations to ensure the filter is operating effectively. In the event of dust emissions, the filter will be replaced.	To better reflect design of storage silos.
Table S1.2 Application	Section 3.4 Furnace requirements	In the event that the temperature falls below the minimum temperature (850°C) an audible alarm will be activated to alert operational staff.	In the event that the temperature falls below the minimum temperature (850°C) an audible alarm will be activated to alert operational staff. The auxiliary burners will also fire up, to increase the temperature in the furnace.	To include for auxiliary burner operation during periods when temperature falls below 850°C.
Table S1.2 Application	Section 3.9 Cooling systems	A total of 10 air cooled condenser units will be provided and located adjacent to the canal (see Figure 3b). Five will be installed for phase 1 and a further 5 for phase 2.	A total of 10 air cooled condenser units will be provided and located adjacent to the canal.	It is requested that references to developing the project in 2 phases are removed. Furthermore, the drawing reference has been removed.

Permit reference	Original EP application reference	Operating technique	Proposed revision to the operating technique	Comment
Table S1.2 Application	Section 3.10 Boiler design	To maintain the flue gas temperature at the optimal temperature required for the flue gas cleaning plant (180ºC)	To maintain the flue gas temperature at the optimal temperature required for the flue gas cleaning plant (190ºC)	To reflect further detailed design of the flue gas cleaning plant.
Table S1.2 Application	Section 3.10 Boiler design	The boiler design has been selected to achieve enhanced energy recovery through reducing the design boiler outlet temperature from the normal value of 200ºC to 190ºC.	Remove	-
Table S1.2 Application	Section 4.1 Emissions to air	The activated carbon will be stored in 2 x 45 m^3 silos.	The activated carbon will be stored in 1 silo of 80 m^3.	
Table S1.2 Application	Section 4.2 Emissions to surface water and sewer	Under normal operation there will be no process discharges to surface water or sewer. In the event of a full boiler maintenance the boilers will need to be emptied. This water will be collected in the blowdown drum and returned back into the boiler prior to start-up.	In the event that excess process effluents are generated (such as emptying the boiler during maintenance activities), these will be required to be discharged off-site. It is proposed to discharge these to sewer in accordance with a Trade Effluent Consent.	The EP variation application included for an additional emissions point to sewer, however this paragraph was accidentally missed in the previous review of the operating techniques (Appendix B of the supporting information to the EP variation).
Table S1.2 Application	Section 4.5 Odour	In the event of a complete shutdown of both lines, air will continue to be extracted from above the waste bunker but will be discharged via an activated carbon filter unit to control odour in the release to atmosphere. These units have been successfully operated at other EEW facilities in Europe	The plant will be of a two-stream design, with maintenance of each line undertaken in succession. Therefore, it is very unlikely for both lines to be shut down at the same time. Odour will be controlled during shutdown periods by minimising the amount of waste in storage. Waste will be run-down prior to periods of planned maintenance. In	

Permit reference	Original EP application reference	Operating technique	Proposed revision to the operating technique	Comment
			addition, doors to the tipping hall will be kept shut during periods of shutdown.	
Table S1.2 Application	Section 4.7 Monitoring and reporting of emissions (water, sewer and air)	Discharges to sewer will be limited to domestic effluents from the onsite amenities. There will be no process discharges to sewer.	Domestic effluents from onsite amenities will be discharged to foul sewer. In addition, in the event that excess process effluents are generated (such as emptying the boiler during maintenance activities), these will be required to be discharged off-site. It is proposed to discharge these to sewer in accordance with a Trade Effluent Consent. This is preferable to having to tanker away this effluent from time to time.	The EP variation application included for an additional emissions point to sewer, however this paragraph was accidentally missed in the previous review of the operating techniques (Appendix B of the supporting information to the EP variation).
Table S1.2 Application	Section 5.4 Emissions to Water and Sewer	The proposed plant will not give rise to process emissions to water and sewer	The proposed plant will not give rise to process emissions to water. In the event that excess process effluents are generated (such as emptying the boiler during maintenance activities), these will be required to be discharged off-site. It is proposed to discharge these to sewer in accordance with a Trade Effluent Consent.	
Table S1.2 Application	Section 5.6 Global warming	-	Remove	Replace section with the updated Greenhouse Gas Assessment submitted with the EP variation application.

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Table S1.2 Response to email dated 08/01/13	Confirmation of nominal design calculations	• Lines = 1 line (phase 1) up to 2 lines (phase 2)	Lines = 2 lines	Although this operating technique was commented on in the previous review of the operating techniques (Appendix B of the supporting information to the EP variation), the reference to 2 phases of the project was still left in. This should be removed, as the project will only be developed in 1 phase.

A Bottom Ash Storage