ENVIRONMENTAL MANAGEMENT SYSTEM

Whitwick Manor, Herefordshire

STL Energy Ltd

VERSION:	**1.1**	**DATE:**	**22/05/2023**		
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Oaktree Environmental Ltd

Waste, Planning & Environmental Consultants

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1.0	27/04/2023	IA	--	Initial Draft
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CONTENTS

List of Appendices:

Appendix I - Drawings

Appendix II - Record Keeping Forms

STL/RF/1 - Waste Input Record Form
STL/RF/2 - Rejected Waste
STL/RF/3 - Waste Output Record Form
STL/RF/4 - Site Diary/Inspection Form
STL/RF/6 - Employee Training Needs Assessment
STL/RF/7 - Complaints Form

****The above forms are advisory only, alternative forms of the operator may be used electronically**

Appendix III - EWC Waste Code List for Accepted Wastes

Appendix IV - Health and Safety – Conditions of site use for staff and visitors

Appendix V - Maintenance Schedules

Appendix VI - Environmental Permit

Site Information & Key Contacts List

Site Address:	Whitwick Manor, Herefordshire		
Site Operator:	STL Energy Ltd	**National Grid Ref:**	360660, 245744

CONTACT	DESCRIPTION	OFFICE HOURS	OUT OF HOURS
Nick Layton	**Operator**	**TBC**	**TBC**
The County Hospital **Stonebow Road, Hereford, Herefordshire, HR1 2BN**	**Main NHS Hospital**	**01432 355444**	999 or 112
The Bodenham Surgery **Brockington Road, Hereford, Herefordshire, HR1 3LR**	**Local Doctor Surgery (GP)**	**01568 797000**	111, 999 or 112
West Mercia Police **Bromyard Police Station, 26 New Road, Bromyard, HR7 4AJ**	**Local Police Non-Emergency**	**101**	**999**
	Police Emergency	**999**	**999**
Hereford and Worcester Fire and Rescue Service **Bromyard Station, New Road, Bromyard, Herefordshire, HR7 4AJ**	Fire and Rescue Service **(in Emergency Dial 999)**	**01432 347049**	**999**
Environment Agency	**Environmental Regulator**	**03708 506506**	**0800 80 70 60**
Herefordshire Council Plough Lane, Hereford, HR4 0LE	**Council Enquiries**	**01432 260000**	
Dwr Cymru Welsh Water	**Local Water Supplier / Sewerage Provider**	**0800 0520130**	
Oaktree Environmental Ltd Lime House, 2 Road Two, Winsford, Cheshire, CW7 3QZ	**Specialist Advisor (Waste and Planning Issues)**	**01606 558833**	

1 General Considerations

1.1 Site Operator/Permit Holder

1.1.1 Oaktree Environmental Ltd was commissioned by STL Energy Ltd to prepare an application for an Installation Environmental Permit (EP) for an Anaerobic Digestion (AD) plant at Whitwick Manor, Herefordshire, in support of which this Environmental Management System (EMS) has been prepared in accordance with the requirements of The Environmental Permitting (England and Wales) Regulations 2016.

1.2 Relevant Contacts

1.2.1 The contact details for STL Energy Ltd are as follows:

STL Energy Ltd	**Contact:**	Nick Layton
Whitwick Manor	**Position:**	Director
Herefordshire	**Contact no:**	TBC

1.2.2 Contact details for Oaktree Environmental are as follows:

Oaktree Environmental Ltd	**Contact:**	Isaac Allen
Lime House , 2 Road Two	**Position:**	Senior Consultant
Winsford, Cheshire	**Tel:**	01606 558833
CW7 3QZ	**E-mail:**	isaac@oaktree-environmental.co.uk

1.3 EMS Reviews

1.3.1 This EMS is reviewed on an ongoing basis by the site operator. Revisions made to the EMS are recorded in the Document History section at the start of the EMS. The EMS is updated over time to reflect changes to operational procedures. It is also updated in response to EA site audits/inspections to ensure that the operation complies with the Environmental Permit and procedures are updated in the event of non-conformances. Any breaches communicated in EA Compliance Assessment Report (CAR) forms will be reviewed and action taken as necessary, including revisions to the EMS.

1.4 Document Change Control Procedure

1.4.1 The changes made to this EMS are summarised and documented at the start of this EMS. In order to ensure that all staff are made aware of any revisions to the EMS that may affect their roles and responsibilities on site, the following procedure will be followed:

1. Once a change is made to this EMS, the document is given a new version number and the changes made are summarised in the Document History and Control Section.
2. Once a change to the EMS has been made, the company director will ensure that all staff affected by the changes are provided with a copy of the revised EMS.
3. Additional training will be provided to site staff (as applicable) to ensure that they are aware of the changes to the operational procedures in the EMS. This will ensure they can undertake their duties in accordance with the EMS to enable compliance with the permit for the operation.
4. Additional training given to site staff will be documented on the staff training form (form STL/RF/06 in Appendix II).

1.5 Site Location, Description and Planning Status

1.5.1 The site is located on Land at Whitwick Manor, Herefordshire as shown on Drawing No. 2102-006-01. The national grid reference for the site is 360660, 245744.

1.5.2 The application site is located at the Whitwick Manor Estate which is a well-established farm complex of buildings in a rural location, surrounded by a mix of woodland and fields with residential properties in the vicinity. Access to the site is gained via the A417 and a short length of private track.

1.6 Permit Area/Waste Management Operations

1.6.1 The permit boundary area is outlined in green on Drawing No. 2102-006-02. All references to ‘the site’ in this Management System shall mean this area and the associated infrastructure, plant and equipment.

1.6.2 The Environmental Permit is required for the operation of an Anaerobic Digestion Facility for the acceptance of up to 176,000 tonnes per annum, predominantly fuelled by poultry manure, apple pomace, digestate and liquid wastes from agricultural processes and food manufacturing.

1.6.3 The site layout is shown on Drawing No 2102-006-02 and 01113-00-E. AD is a biological process, which breaks down organic matter within biodegradable wastes in the absence of oxygen, through the actions of a variety of micro-organisms. The result of these processes is the production of biogas, which consists predominantly of methane (CH_4) and carbon dioxide (CO_2) and a useable digestate product which has environmental benefits when used in place of fertilisers.

1.6.4 The initial feedstock menu will be made up of the following materials:

- Manure (100,000 tonnes/annum);
- Apple pomace (16,000 tonnes/annum);
- Digestate (35,000 tonnes/annum); and,
- Liquid waste from dairy and drink industry products (25,000 tonnes/annum).

1.6.5 The following sections provides details of the operation.

Feedstock Reception

1.6.6 All feedstocks will be received over a weighbridge. The poultry manure will be stored within an enclosed feedstock building with fast acting roller shutter doors. The building will be maintained under negative pressure, with exhaust air from the building directed to the CHP plant for abatement of residual ammonia and odour. Liquid wastes and digestate will be unloaded direct to enclosed tanks prior to introduction to the process. Apple pomace will be stored within clamps. Any liquid residues and/or recirculation water from the end of the process will be stored in one of the large tanks ready for feeding hourly into the pre-treatment process.

Feeders

1.6.7 There will be 4 walking floor feeders of approximately 100m^3 capacity, sufficient for 12 hours. These will be filled twice a day, morning and evening.

Pre-Treatment

1.6.8 There will be three hydrolysis/pasteurisation tanks, each being 1000m^3 in volume to allow for the feedstocks to be pre-processed by hydrolysis, pasteurisation and for ammonia removal. Approximately 55% of the ammonia is removed before the digestion process to prevent the nitrogen from inhibiting the digestion process and to extract 55% of the nitrogen into a concentrated ammonium sulphate solution which can be sold as a fertiliser. A large 6250m^3 ammonium sulphate storage tank is provided for.

Anaerobic Digestion

1.6.9 The pre-treated material is pumped into 4 primary digesters, each 6250m^3 in volume and then into two secondary digesters, also providing 6250m^3 of volume. These will be maintained at over 40 Celsius for the digestion process and fully stirred. The biogas that is produced will bubble up to the headspace in the double membrane roofs. The roofspace has support straps and a de-sulphurisation net as well as a flexible gas membrane and air-blown outer weather membrane. The resultant biogas is around 55% methane (CH_4) and 45% carbon dioxide (CO_2) and is piped via desulphurisation tower(s) for use in the CHP units and the biomethane plant.

Nutrient Recovery

1.6.10 The digestate overflow will be treated to extract nutrients in a multi-stage process where the majority of the remaining nitrogen, phosphates and potassium are removed. These processes collect the nutrients in a concentrated form including ammonium sulphate and/or nitrate, calcium phosphate and/or struvite, which can be easily transported and then applied as available fertilisers where and when agronomically required.

Digestate Separation

1.6.11 The low nutrient digestate is then separated with screw presses and/or decanter centrifuges into a benign solid soil improver and a liquid stream. The liquid stream is still around 1% solids so may require further processing through microfiltration or reverse osmosis/ion exchange plant to create a liquid stream suitable for re-circulation or final polishing in a reed bed before discharge.

Reed Bed and Buffer Lagoons

1.6.12 An area of around 5.33ha has been allocated for a reed bed system which further cleans the water. A buffer storage lagoon has been provided for to allow for maintenance and process control. A second lagoon has also been provided for to capture rain from the site which can be used in the AD process or discharged to the local ditch network.

Biomethane Plant

1.6.13 The biogas is first dehumidified and polished with carbon filters prior to compression. The clean dry biogas is then compressed to around 15bar before passing through a 3-stage membrane plant which separates out the gas into a c.98% pure CH_4 biomethane stream and a 99% pure CO_2 stream. The biomethane stream is then piped to the Network Entry Facility (NEF) and then onto the gas grid. The CO_2 stream is then piped to the CO_2 liquefaction plant.

Network Entry Facility (NEF) and Compressor

1.6.14 The NEF unit effectively checks the quality of the biomethane gas meets the network entry requirements. A propane injection system is required to adjust the calorific value (CV) of the gas to meet network settings and also the gas is required to be compressed up to between 19-21bar to match the network pressure.

CO_2 Plant / Dry Ice manufacture

1.6.15 The CO_2 stream is then compressed to around 18bar before cooling to around minus 30 degrees Centigrade to liquify the gas. It passes through a reboiler so that any contaminants including a small amount of residual methane can be separated. This 'reject' gas is then piped back to the AD plant so that the methane can be recovered. A building for a dry ice (solid CO_2) plant can treat a proportion of the CO_2 stream to make dry ice for use in the catering / food delivery industry. The balance of the liquid CO_2 is stored in vacuum insulated tanks prior to collection by Heavy Goods Vehicle (HGV) tankers.

CHP Units

1.6.16 Some of the biogas is used directly in two $1MW_e$ CHPs which are provided to supply power to the plant as well as the farm and grain store. In addition to the green electricity generated the units generate around 2MW of heat which is used to heat the digestion tanks, pre-treatment and nutrient recovery processes. It is hoped some surplus will be available in the summer to facilitate any grain drying if required.

Backup Boilers

1.6.17 Two backup boilers which can run on biogas will be provided for periods of extreme weather or when a CHP is taken off-line for servicing to allow the plant to maintain its operating temperature.

Flare

1.6.18 A dual stream flare is to be installed to allow either excess biogas or rejected biomethane to be burned at a high temperature so as to prevent any methane emissions. In practice, it is anticipated that this will be used rarely, such as during maintenance of equipment or for a few minutes when the biomethane is adjusted prior to injection into the grid.

1.6.19 The operations include waste recovery operations listed Annex IIA and IIB of The Waste

Framework Directive 2000/442/EEC. These are summarised below:

R1: Use principally as a fuel or other means to generate energy;

R3: Recycling or reclamation of organic substances;

R5: Recycling/reclamation of other inorganic materials;

R13: Storage of waste pending recovery; and,

D10: Incineration on Land.

1.7 Hours of Operation

1.7.1 The AD process on site operates continuously for 24 hours per day, 7 days per week, except for periods of maintenance. The site will be open for the delivery and receipt of wastes/feedstocks and export of products according to the hours specified by the planning.

1.7.2 The only other activities on site which will be permitted outside of operational hours are onsite maintenance works, emergency deliveries of waste/plant/machinery and general office use.

1.7.3 During times where the site is closed or not in operation, the site will be secured to prevent unauthorised vehicular and/or pedestrian access.

1.8 Waste Types

1.8.1 A detailed breakdown of the waste types permitted will be attached to this management system in Appendix III.

1.9 Staffing and Management

1.9.1 The site will open for the deposit of waste/feedstocks or for other essential operations during the hours listed in Section 1.4. The table below details the staff structure of the site when operating at full capacity.

Table 1.1 - Staffing numbers and responsibilities

Position	Employees	Responsibilities
Director	1	Overseeing all activities which take place at the site, waste handling/loading, AD plant operation/management, staff training
Technically Competent Manager (TCM)	1	Overseeing permit compliance
General Manager	1	Overseeing day to day operations and compliance with permit
Site Manager	1	Overseeing day to day operations and compliance with permit
Site Operatives	3	Traffic marshals, mobile plant drivers, operators and general housekeeping
Admin/office staff	1	Managing site administration

1.9.2 The following provides a more detailed description of the roles and responsibilities of the staff identified above:

Site Director/TCM

1.9.3 Nick Layton, who will be the TCM for the site, is the Site Director but it also involved in the day to day running and management of the plant. The following summarises the roles and responsibilities of the Site Director:

- Management of all site staff on a day to day basis;
- Remote management of plant via computer or mobile phone;
- Operation of the plant, including feedstock acceptance/receipt, handling, processing and loading;
- Staff training;
- Response to automated alarms (alarm diagnosis and resolution of any issues);
- TCM for the site;
- Management of feedstock supply agreements;
- Management of external contractors undertaking works on site, eg maintenance and servicing contractors;
- Site inspections and monitoring;
- Logging complaints and taking necessary action;
- Site maintenance; and,

- Maintaining records associated with the above, as applicable.

1.9.4 The Site Director has full control of the plant via remote access. The plant can be accessed from the computer system within the site office or from mobile phone, ensuring that the Site Director can oversee and manage the entire operation on a continual basis and can be alerted by alarms on a 24/7 basis. In the event of an alarm, the Site Director will receive an alert, will review the alarm which has been activated and take steps to solve the problem, either via remote management or attendance on site.

1.9.5 The Site Director provides on the job training to all employees involved in the operation of the AD plant. Records of training provided to site staff will be maintained on Form STL/RF/6 in Appendix II.

General and Site Manager

1.9.6 The site managers feed the plant on a day to day basis and are responsible for carrying out routine maintenance and site checks. The site managers report directly to the Site Director. The following summarises the roles and responsibilities of the site managers:

- Operation of the plant, including feedstock acceptance/receipt, handling, processing and loading;
- Site inspections and monitoring, including daily visual inspection of all plant and machinery used on site, olfactory odour monitoring;
- Routine site maintenance;
- Assistance to Site Director, as required;
- Logging complaints and taking necessary action; and,
- Maintaining records associated with the above, as applicable.

Site Operatives

1.9.7 General operatives feed the plant on a day to day basis, on occasions when the site manager is unavailable. The general operatives report directly to the Site Director. The

general operatives receive full training from the Site Director before being permitted to undertake activities associated with operation of the AD plant. Records of training provided to site staff will be maintained on Form STL/RF6 in Appendix II.

Admin Staff

1.9.8 The admin staff are responsible for ensuring records are maintained within the site office and for handling invoices.

1.10 Health and Safety

1.10.1 All operations on site will be carried out in accordance with the relevant requirements of the Health and Safety at Work Act 1974. Conditions of site use for employees, visitors and contractors are attached to this Management System as Appendix IV. These conditions will be shown to all site users and must be signed prior to using the site. Anyone refusing to comply with the conditions of use will be asked to leave the site.

1.10.2 Given the nature of the process, certain areas of the site are designated as explosion zones, due to the potential presence of gas. Within these zones, potential sources of ignition are strictly prohibited. Within the designated explosion zones, the only equipment permitted for use (electrical, mechanical or protective systems) are items of plant and equipment which meet the requirements of the Equipment and Protective Systems intended for Use in Potentially Explosive Atmospheres Regulations 1996. Signs should be erected on site to notify of explosion zones.

1.10.3 After final design is complete a DSEAR study will be performed to define the ATEX explosion zones.

1.10.4 The use of portable electronic equipment including mobiles phones and cameras is strictly prohibited within the explosion zones.

1.11 Fit and Proper Persons

1.11.1 The site will assign a TCM who will provide the required attendance time at the facility as required by guidance periodically issued by the EA. A copy of the appointed TCM's Certificate of Technical Competence (COTC) will always be made available in the site office.

1.11.2 The company, through the TCM, will ensure that a nominated deputy is sufficiently trained and familiar with the EP and this EMS document in addition to all relevant company procedures who, in the absence of the TCM, will act as the competent person. If either the TCM or deputy is changed, the EA will be informed of the change and the relevant details of the replacement as soon as possible.

1.12 Convictions

1.12.1 At the time of application, neither STL Energy Ltd nor any of the relevant people within the company had been convicted of a relevant offence.

2 Site Engineering and Infrastructure

2.1 Site Description

2.1.1 The site is located as shown on Drawing Nos. 2102-006-02.

2.2 Access and Parking

2.2.1 The site is accessed from the A417. Parking will be available within the site, as shown by drawing no. 2102-006-02 and 01113-00-E.

2.3 Site Office

2.3.1 The documents listed below will be retained in the site office.

Documents to be retained in site office
The Environmental Permit (original & any subsequent variations)
This Environmental Management System (EA agreed document)
Current site diary (to record all inspections/visitors to the site)
Environment Agency Inspection (CAR) forms
In-house inspection sheets/recording forms
Duty of care transfer notes (for 2 years minimum)
Hazardous waste consignment notes (kept for 5 years)
Waste delivery tickets
Accident book (& 1st aid kit)

2.4 Notice Board and Signs

2.4.1 A notice board will be erected at the site entrance, which displays the following information:

- The site name and address.
- The name of the permit holder and operator.
- The Environmental Permit number and accompanying statement stating that the site is permitted by the EA
- Environment Agency contact details, Emergency No. 0800 80 70 60 and
- General Enquires No. 03708 506 506.
- Operator's "out of hours" emergency contact details.

- Operating hours.

2.4.2 Additional signs will be displayed around the site for operational / health & safety purposes. All staff and visitors will be required to comply with the requirements of all signs whilst on site.

2.5 Site Security

2.5.1 Security measures will prevent unauthorised pedestrian and vehicular access to the site both during and outside of operational hours.

2.5.2 Security measures in place will include the following:

- Supervision of people entering site during normal working hours;
- Visitors are required to sign in and receive a site induction procedure before being permitted to enter the site;
- Signs are in place warning unauthorised people not to enter the site.

2.6 Fuel storage

2.6.1 Procedures for fuel storage on site are as follows:

- Tanks will be surrounded by a bund capable of containing a minimum of 110% of the volume of fuel stored in the tank.
- All pipework and associated infrastructure will be enclosed within the bund.
- A lock will be fitted to the tank valve to prevent unauthorised operation.
- All valves and gauges on the bund will be constructed to prevent damage caused by frost.
- No combustible waste will be stored within 6 metres of the tank.

2.6.2 The tank will be clearly marked showing the product within and also its capacity.

2.7 Rejected/Quarantined Waste

2.7.1 All loads which arrive on site will be inspected by an operative prior to unloading. In the event that any non-conforming wastes are identified the load will be rejected and the customer/waste producer will be asked to remove the load off-site.

2.7.2 Loads are also examined at the point of unloading. If they are found to be unacceptable at this point the load will be reloaded and returned to source.

2.7.3 In the unlikely event that a non-conforming load is deposited at the site, it will be immediately rejected and/or quarantined ready for collection or any contamination (i.e plastics) transferred into a clearly labelled rejected/quarantine skip with a maximum capacity of 2.5 tonnes.

2.7.4 The site has suitable arrangement in place to ensure that skip will be segregated from other loads deposited and stored at the site. The skip will be labelled and sealed to prevent the escape of any non-conforming wastes which ensures that it is stored appropriately pending removal off-site. The skip will be removed from the site within 48 hours.

2.7.5 The location of this skip has not been included on Drawing No. 2102-006-02 as the skip is mobile and the location may vary as operating conditions permit (i.e. to permit the loading of rejected wastes but clear labelling and management control will ensure its use as specified).

2.7.6 All non-conforming/rejected/quarantined loads will be recorded within the site diary and on the operators computerised spreadsheet prior to the load being removed from site or transferred to the rejected waste skip. The EA and waste producer will be notified of any non-conformances resulting in a rejected load.

2.8 Drainage

2.8.1 Clean surface water will be kept separate from foul drainage. Drainage details are shown on the plan within Appendix I.

2.9 Vehicles, Plant and Equipment

2.9.1 The table below details the plant/equipment on site. Only trained operators will be permitted to drive/operate the plant/equipment listed below.

Table 1.1 - Plant & Equipment

ITEM	*NUMBER*	*FUNCTION*
Loading shovel	1	Loading/unloading/movement of wastes/feedstocks
Telehandler	1	Loading/unloading/movement of wastes/feedstocks
AD Plant	1	Processing of feedstocks (see layout plan in Appendix I for full description of plant and equipment to be used in the installation)

2.10 Mobile and Fixed Plant Maintenance

2.10.1 All items of plant and vehicles will be subject to preventative maintenance checks to ensure their safe operation and to prevent any potential situations which may give rise to adverse impacts on the environment.

2.10.2 Much of the plant and equipment on site will be subject to periodic manufacturer maintenance to ensure proper working order in the form of service contracts. Site management will undertake or delegate additional preventative maintenance checks on a more frequent basis to ensure, where possible, the machinery is mechanically sound. These checks will be carried out using a preventative maintenance checklist and any results / defects will be recorded in the site diary and actioned immediately and, in any event, prior to operational use. Specific maintenance schedules for plant and equipment are outlined within Appendix II.

2.10.3 Site management will undertake or delegate additional preventative maintenance checks on a more frequent basis i.e. daily, before, during and 1 hour at the end of each working day using a checklist similar to that in Appendix II to ensure the following:

- Machinery is mechanically sound for use and no presence of black fumes or trailing liquids visible prior to use or following shutoff of plant/equipment.

- All plant will be powered-down and completely shut off prior to cessation of operations on any given day.
- All plant and equipment vehicles are fitted with fire extinguishers in the cab. Rubber strips are not considered appropriate as they are usually removed via uneven and bumpy ground.
- Dust from processing/treatment operations on site can settle throughout the working day onto processing plant, plant exhausts and engine parts so a fire-watch will be implemented after cessation of works and equipment powered down for 1 hour each day to remove any dust/fluff using brushes, hoses etc. Any build of dust/fluff will be removed from the equipment and deposited into a container to await removal from site and site management informed.

3 Site Operations

3.1 Preliminary Procedures

3.1.1 Guidance will be given by the site management to all employees, sub-contractors, other waste carriers and customers regarding the waste types and operations which are acceptable at the site i.e. a copy of Appendix III of this document. The site will be used for the acceptance, storage and processing of waste using STL Energy Ltd's own vehicles/contracts and also for third-party users/hauliers whose details would be checked prior to the delivery/collection of waste.

3.1.2 The procedures below would be followed prior to the receipt of waste on site.

3.1.3 When a driver employed by the permit holder arrives at the waste producer's premise's he/she will inspect the load for conformity with relevant regulations and safety procedures.

a) If the load is satisfactory the driver will sign the relevant paperwork (Duty of Care transfer note/delivery ticket) and remove the load from the premises.
b) If the waste does not meet the description stated on the controlled waste transfer note the customer is advised to check the note and give a more detailed description of the waste.
c) If the more detailed description of the waste reveals that the waste is not/permitted at the recycling centre then the customer is advised that the waste must be taken to another site which is appropriately permitted to accept the waste(s).

3.1.4 If further instructions are needed the driver may also report back to the site manager.

3.2 Checking In & Inspection of Loads

3.2.1 All incoming vehicles are required to report to the site office. The details of the load will be recorded, and the transfer note and company documentation will be further checked by the operator to ensure that the load is acceptable at the site. The weight

of all loads will be recorded using a weighbridge or agreed WRAP conversion weights for loads where the weight is not known upon receipt at the site. Any deviation from these procedures or problems with any loads will be reported to the site manager.

3.2.2 All vehicle drivers must report to the site/weighbridge office upon arrival at the site. Each load will be weighed, recorded and its contents inspected. All waste accepted on site will be directed to the appropriate reception area.

3.2.3 Once a load has been accepted the driver will be asked to unsheet the vehicle (if it is sheeted) and a visual inspection of the contents will be carried out to ensure that the material complies with the EP. If non-compliant waste is discovered before deposit, the load will not be accepted and disposed of at an approved facility. In cases where the presence of unauthorised waste is likely to lead to a breach of permit conditions, the EA will be contacted immediately to agree a course of action.

3.2.4 Each load is assessed for visual signs of contamination within the material. If a load is deemed unacceptable, then it will be returned to its source.

3.2.5 Loads are also examined at the point of unloading. If they are found to be unacceptable at this point the load will be reloaded and returned to source. If small levels of contamination are noted they are handpicked and reject material placed in a skip for safe disposal.

3.2.6 If hazardous waste or suspected hazardous waste outside the permitted waste types in the permit is deposited on the site the material will be left alone with precautions taken to absorb any spillages and the area cordoned off. The EA will be contacted as a matter of urgency and the material left in situ until removed under the EA's instruction.

3.3 Waste Acceptance Procedure

3.3.1 All incoming vehicles upon arrival are required to report to the person in charge of waste acceptance at the site. The details of the load will be recorded, and the duty of care note/company documentation will be further checked by the operator to ensure that the load is acceptable at the site, including a visual check prior to the vehicle

proceeding to the tipping area. Any deviation from the procedures or problems with any loads will result in tipping facilities being suspended for the offending company. Loads which are not acceptable within the above terms will be rejected.

3.3.2 Analysis of any liquid wastes will be requested and reviewed prior to the transport of liquid wastes to the site. Authorisation for tankers and other vessels carrying liquid wastes to enter the site will be granted only if the operator is satisfied that the wastes have been suitably classified in accordance with WM3 and that the waste has been coded correctly.

3.3.3 A sample of all new incoming wastes will be sampled by a suitably qualified and experienced technician and tested at a UKAS accredited laboratory for the following parameters:

- Chemical oxygen demand;
- Arsenic, cadmium, chromium, hexavalent chromium, copper, nickel, lead, zinc and mercury;
- Nitrate and nitrite;
- Total organic carbon;
- Total phosphorous;
- Chemical oxygen demand; and,
- pH .

3.4 Weighing and Categorising Loads

3.4.1 The site will include a weighbridge which will be used to weigh incoming and outgoing loads to facilitate accurate recording of throughputs. Details of weight of load will be contained on the Waste Transfer Note.

3.4.2 The weights of loads will also be verified using standard Environment Agency and WRAP agreed volume-to-weight conversion factors.

3.5 Waste Sorting /Treatment procedure

3.5.1 Once a load has been accepted by the operator the contents of the delivery vehicles is either loaded directly into the AD plant or discharged into the reception area. All feedstocks that have been deposited at the site will then be transferred to the plant for processing.

3.6 Waste/Product Removal and Export

3.6.1 When a collection vehicle arrives at the site the driver will be instructed to report to the site office on arrival. All relevant documentation will be completed, and the vehicle will be passed to pick up the load and take it to the designated recycler/disposal site or end user.

3.7 Record Keeping

3.7.1 STL Energy Ltd use detailed waste transfer and product notes in paper and electronic form to ensure compliance with the Waste Duty of Care Code of Practice - March 2016 (Section 34(9) of the Environmental Protection Act 1990). The following points detail the correct information required in order to comply with the Waste Duty of Care Code of Practice which the operator will provide on all documentation:

- a written description of the waste which has been agreed and signed by the operator and the next holder. The description is part of the waste information the operator will provide.
- a statement confirming that the operator has fulfilled the duty to apply the waste hierarchy as required by regulation 12 of the Waste (England and Wales) Regulations 2011 (see Waste Hierarchy Guidance for England and Wales)
- the description of the waste is accurate and contains all the information required to ensure the lawful and safe handling, transport, treatment, recovery or disposal by subsequent holders, including classification of the waste by using the appropriate codes (referred to as the List of Wastes (LoW) or European Waste Catalogue (EWC)) - Appendix A of the Waste Classification Technical Guidance provides a list of the codes as well as advice on how to assess and classify waste.

- the quantity and nature and whether it is loose or in a container, if in a container, the type of container
- the time and place of transfer
- the SIC code of the transferor (current holder of the waste)
- the name and address of the transferor and transferee (person receiving the waste) and their signatures (the signature can be electronic as long as an enforcement officer can view it)
- the capacity in which the transferor and transferee are acting (e.g. as a producer, importer or registered waste carrier, broker or dealer) and their relevant authorisation to act in that capacity (e.g. their permit number or registration number)

3.7.2 For non-hazardous waste this will be done by using:

- a paper WTN and form to fill in or alternative documentation e.g. an invoice, as long as it contains all the required information.
- a season ticket which is a single waste transfer note that covers a series of non-hazardous waste transfers. The season ticket will last up to one year and be used for regular transfers of the same type of non-hazardous waste with the same carrier. If the operator has several sites serviced by the same carrier with the same types of waste collected, these can be listed in a schedule to the season ticket. The operator will keep a record of the collection times and the quantity of waste.

3.7.3 A waste information note will not be required for non-hazardous waste if the waste holder does not change on the transfer of waste e.g. the waste is moved to other premises belonging to the same business. However, it is best practice that the business understands who has responsibility for that waste and a record is kept of internal transfers for audit purposes.

3.7.4 If any non-conforming hazardous waste is to be removed, it will be done so using a fully completed hazardous waste consignment note and sent to a suitably permitted site. The records of which will be kept for 5 years.

3.7.5 A summary of waste types and quantities deposited at and removed from the site and origin and destination details will then be forwarded to the EA using the standard Generic Operator Returns electronic spreadsheet(s), with submission due within one month of the end of each quarter as below:

a) Quarter 1: January to March (due on or before 30th April)
b) Quarter 2: April to June (due on or before 31st July)
c) Quarter 3: July - September (due on or before 31st October)
d) Quarter 4: October - December (due on or before 31st January of the following year)

3.7.6 Outcomes of inspections of waste types, hardstanding areas, transfer/treatment areas, storage areas, drainage channels, etc. will be recorded using the site inspection form STL/RF/4 or similar document and detailed comments are entered into the site's diary (including action taken or proposed).

3.7.7 Visitors to the site will be made to sign the visitor's book upon arrival and exit stating the purpose of their visit and whom they represent.

3.8 Management Techniques

3.8.1 All measures necessary to achieve a high level of protection of the environment and to ensure that the site is operated in accordance with the various management systems and permit conditions will be strictly adhered to.

3.8.2 The manner in which the facility is managed is a critical element in ensuring emissions from the site operations are minimised. Therefore, management of this facility ensures:

a) Staff are competent to manage and operate the facility i.e. fit and proper persons;
b) Waste acceptance procedures are in place;
c) Appropriate storage and handling procedures are in place;
d) Waste/product dispatch procedures are in place;

e) Procedures and control techniques in place to minimise potential emissions to air, land and water;

f) There is an EMS, i.e. this document, in place to ensure standards are maintained, including incidents and complaints management procedures;

g) A communication programme is in place; and,

h) A health and safety programme is in place and is coherently conveyed to all staff and rigorously enforced throughout the whole of the organisation.

3.9 Site Closure Plan

3.9.1 In the event that the site ceases to operate as a waste transfer/treatment facility as set out in the site's EP, the following steps will be followed to achieve site closure:

a) Contact the EA to advise the Environment Officer(s) that the site is planned to cease / has ceased the acceptance of wastes under the permit.

b) The amount of residual processed and unprocessed waste on site will be assessed by the TCM to set a timetable for the final processing and timely removal of waste from site.

c) Following removal of all waste, plant and machinery from site a Site Investigation will be undertaken to ascertain the ground conditions of the land to which the site relates.

d) A surrender application will then be submitted to the EA for determination.

3.10 Contingency Measures for Feedstock Diversion

3.10.1 In the event of abnormal operation/plant breakdown, any methane produced as part of the AD process will be flared off using the emergency flare if it cannot be transferred to the National Grid. If necessary, any feedstocks/wastes which cannot be accommodated at the site will be diverted for treatment, recovery or disposal at a suitably permitted facility in order to avoid waste being stored at the site for long periods of time.

3.11 Secondary Containment of Digestate

3.11.1 In the unlikely event that one of the digesters (vessel/tank) on site were to fail and release digestate the site must ensure that suitable secondary containment is available.

3.11.2 All tanks are appropriately bunded to provide sufficient containment in the event that tanks should fail, as shown on the layout plan within Appendix I.

4 Environmental Control, Monitoring and Reporting

4.1 Breakdowns and Spillages

4.1.1 In the event of breakdown of the loading plant, an alternative machine will be brought on site until it is repaired. If an alternative machine cannot be used then waste will be stored securely until the plant is repaired. The repair will be carried out at the most convenient location with absorbents used to clear oil or fuel spillages.

4.1.2 All site surfaces will be inspected daily when the site is in operation. Debris will be swept as required and placed in a skip for disposal to a suitably permitted site.

4.1.3 Any spillages of fuel/oil will be cleared immediately by depositing sand or absorbents on the affected area. The sand or absorbents will be placed in a skip to be taken to a suitably permitted site for disposal. All spillages of waste and windblown litter will be cleared by the end of the working day in which they occur. Spillage clearance procedures are detailed in Section 5.4.

4.1.4 All wastes liable to give rise to contamination will be removed from the site if the site is not secure or if operations cease or are temporarily suspended.

4.2 Site Inspections and Maintenance

4.2.1 The inspection frequencies for maintenance/housekeeping are listed within Appendix V. Record form STL/RF/4 (or similar) will be used to enter specific details of any maintenance undertaken as a result of any problems identified during the site inspection. The inspection form will be completed by a person who is familiar with the requirements of the EMS and EP for the site. All details of defects, problems and repairs carried out will be recorded on the form on the day that each event occurs. Detailed comments may also be recorded in a site diary.

4.2.2 All repairs to site security will take place as soon as practically possible and the site will be made secure until the repair has been carried out. Any major defects found during the daily site inspection will be repaired as soon as practically possible.

4.2.3 Essential spares for plant maintenance are kept on site at all times.

4.3 Daily Equipment Checks

4.3.1 Daily plant checks are undertaken on plant and equipment. The results are recorded within the site diary on inspection form STL/RF/4. The checks are visual inspections to identify any obvious signs of damage or defect and the condition of the plant and equipment. The daily checks are undertaken by the Site Manager.

4.4 Control of Mud and Debris

4.4.1 Vehicles will be visually inspected before exit to check that loads are safe and that no mud is carried out onto the site's access road or onto the surrounding highways on the wheels or bodies of HGVs. Visual inspections of the vehicle running surfaces at the site will be carried out daily (see STL/RF/4), however, staff will report any problems with mud or debris on the site roads immediately to the site manager.

4.4.2 The length of surfaced road which each delivery/collection vehicle must track to egress the site should be adequate to ensure that any residual materials on the wheels or chassis of the vehicles should be shed upon exit. All site roads will be kept free from mud/debris to ensure maximum efficacy.

4.4.3 The deposit of material on the access road or public highway will be treated as an emergency and will be cleared immediately by the operator using either a brush and shovel or vacuum tanker/road sweeper if necessary. Silt will not be washed into roadside drains or gullies.

4.5 Control and Monitoring of Dust

4.5.1 The nature of the feedstocks used in the AD process, the digestate produced and the enclosed nature of the AD process ensures that potential for dust emission is very low. However, a series of dust mitigation measures will be implemented on site to ensure dust emissions are controlled as far as is practically possible. The measures include:

- Sheeting of vehicles delivering waste to the site (if necessary);
- sheeting of vehicles transporting potentially dusty loads off site;
- cleaning of any spillages using wet cleaning methods;
- Storage of solid wastes/feedstocks will be limited to the height of the storage clamps or capacity of building; and,
- drop heights **ALWAYS** minimised to prevent dust emissions.
- A permanent water supply is available on site in all climatic conditions to ensure that the dust suppression systems can function effectively. Any external water pipes will be lagged to prevent frost damage during winter months.

4.5.2 Despite the low risk of dust, site operatives will continuously monitor dust emissions whilst the site is in operation and will report back to the site supervisor for advice if required. The site supervisor will make a formal visual inspection of dust emissions throughout the day. Results of monitoring will be entered into the site diary/record forms.

4.5.3 The deposit of material on the access road or public highway will be treated as an emergency and will be cleaned immediately using a brush and shovel or a road sweeper/vacuum tanker (hired-in) if necessary.

4.5.4 In the unlikely event that dust levels result in complaints; a bowser will be sourced to dampen down dusty stockpiles and site surfaces to prevent any further dust generation.

4.6 Odour Control

4.6.1 The site has an odour management plan (OMP) in place which covers all potential odour sources and mitigation measures. The OMP will be kept in the site office.

4.6.2 Feedstocks will be delivered to site in covered tractors/trailers or HGV to reduce risk of odour emissions during transportation. Non-liquid feedstocks will be stored within designated storage areas. The poultry manure storage area will be enclosed and maintained under negative pressure with exhaust air abated within the CHP plant.

Through careful site design, transfer distance between storage areas and feed hoppers is minimal. Care will be taken to avoid unnecessary mechanical agitation of feedstocks in feed hoppers whilst material is being loaded. Liquid feedstocks will be delivered direct to the process from enclosed tankers minimising potential for odour.

4.6.3 Once in the process, feedstocks are fully contained/enclosed, thus preventing potential for odour. Tanks and pipework must be kept airtight to prevent ingress of air to the system, this also serving to ensure potential odours are contained.

4.6.4 Regular olfactory assessments will be carried out around the site boundary and results recorded on the inspection form for the site (i.e. record form STL/RF/4). This will include twice daily inspections by the site manager or supervisor.

4.6.5 Strict turnaround times for any wastes which could give rise to odours will mean that the site will present a low risk of odour nuisance.

4.6.6 The complaints procedure in record form STL/RF/7 will be rigorously enforced should a third-party complaint be received from a public or private source.

4.7 Litter Control

4.7.1 Given the nature of wastes accepted at the site (i.e. no light wastes including paper/cardboard), no significant litter issues are anticipated.

4.7.2 Daily inspections of the site boundary will be carried out for the presence of windblown litter and operatives will be instructed to collect the litter and place it in a skip for disposal/recovery before the end of the working day. In any event, all light waste will be placed in skips before the end of the working day.

4.7.3 Regular checks of the areas immediately beyond the site boundary will be carried out by site operatives.

4.7.4 The greatest risk of litter would be during windy conditions. The site will be operated giving due regard to the potential effects of windblown litter.

4.8 Control of Pests, Birds and other Scavengers

4.8.1 The site will be inspected daily for the presence of vermin and the results of the inspection noted in the site diary or site inspection form. A recognised pest control contractor will be brought in within 48 hours if any problems are encountered.

4.9 Control and Monitoring of Noise & Vibration

4.9.1 The site operations will be carried out using the Best Practicable Means at all times.

4.9.2 The location and surrounding land uses means noise associated with the operations will not greatly increase the existing noise level in the surrounding area. The waste operations will be carried out using the best practicable means at all times.

4.9.3 The likely sources of noise arising from the development; and, the actions to be taken / procedures to be followed or planned in order to prevent or minimise levels are contained with the site Noise Management Plan.

4.10 Procedures for Gas Pressure, Composition and Production Monitoring

4.10.1 Gas pressure and composition will be monitored by an automated system, which feeds back to the site control and management system to alert the site operator to any issues.

4.11 Alarms and Response Procedures

4.11.1 The plant will be managed via an automated control and management system, which alerts to the Site Director of any issues via alarms. The following automated alarms are in place to alert the site operator of any issues in order to allow appropriate action to take place:

- Gas level alarm;
- Tank temperature;
- Gas pressure; and,

- Tank level.

4.11.2 The Site Director can then view details of the alarm and take appropriate action. The majority of the time, issues can be rectified remotely. However, the Site Director will attend the site if an issue cannot be resolved remotely. In the event of an emergency or major incident, the procedures in Section 5 will be followed.

4.12 Air Point Source Emissions Monitoring

4.12.1 The air emission limits which apply to the process are outlined below. All monitoring results will be recorded in the site diary. Unless otherwise agreed with the Environment Agency, the personnel undertaking the stack emissions monitoring will be MCERTS accredited or certified.

4.12.2 Emission monitoring results will be provided to the Environment Agency within 28 days of the end of each annual reporting period, unless otherwise agreed with the Environment Agency. Reference should be made to the Environmental Permit in Appendix VI for details of the reporting period start date.

Table 4.1 – CHP Unit Emission Limits

Pollutant	Maximum Emission Concentrations Normalised to 273.15K, 101.3KPa, dry gas, 15% O2 ($mg.Nm^{-3}$)	Maximum Emission Concentrations Normalised to 273.15K, 101.3KPa, dry gas, 5% O2 ($mg.Nm^{-3}$)	Maximum Emission Concentrations Normalised to 273K, 101.3KPa, ($mg.Nm^{-3}$)	Monitoring Frequency and Method
Nitrogen oxides (NO_x)	190	-	-	Annual, MCERTS Accredited, in accordance with EA guidance
Sulphur dioxide (SO_2)	40	-	-	
Carbon monoxide (CO)	-	1400	-	
Total Volatile Organic Compounds (VOC) (Including Methane)	-	1000	-	
Total Non Methane VOCs	-	-	10	

Table 4.2 – Backup Boiler Emission Limits

Pollutant	Maximum Emission Concentrations Normalised to 273.15K, 101.3KPa, dry gas, 3% O_2 ($mg.Nm^{-3}$)	Maximum Emission Concentrations Normalised to 273K, 101.3KPa, ($mg.Nm^{-3}$)	Monitoring Frequency and Method
NOx	500	-	Annual, MCERTS Accredited, in accordance with EA guidance
SO2	350	-	
CO	1400	-	
Total VOC (Including Methane)	1000	-	
Total Non Methane VOCs	-	10	

Table 4.3 – Flare Emission Limits

Pollutant	Maximum Emission Concentrations Normalised to 273K, 101.3KPa, dry gas, 3% O_2 ($mg.Nm^{-3}$)	Monitoring Frequency and Method
NO_x	150	Upon commissioning of plant and in the event the flare is operational for more than 10% of the year. MCERTS Accredited, in accordance with EA guidance.
Total Volatile Organic Carbon (TVOC)	10	
CO	50	

4.13 Water Point Source Emissions Monitoring

4.13.1 The table below outlines emission limits which apply for emission point W1. Monitoring is required on a monthly basis.

Table 4.4 – Point Source Water Emission Limits – Emission Point W1

DETERMINAND	LIMIT
Volume	5.53l/s
Chloride	30mg/l
BOD	6.5mg/l (O)
pH	Between 6 and 9
Phosphorous	0.05mg/l (P)
Ammoniacal Nitrogen (as N)	0.13 mg/l

4.14 Complaint Procedure

4.14.1 Any third party complaints received will be recorded on form STL/RF/7 and will include a record of the complaint, particulars of the complainant and details of any action taken to alleviate the problem to ensure the likelihood of a future third party complaint is minimised.

5 Emergency Procedures

5.1 General

5.1.1 In addition to obligations imposed by RIDDOR '13 (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013) the permit holder will notify the EA of any serious injuries to employees of STL Energy Ltd, other site users or members of the public arising as a result of operations on site. Minor injuries such as cuts and grazes etc. will be recorded in the accident book on site. Separate procedures will be used for different types of emergency. An emergency at the site is defined by the site management as follows:

"Any incident which is likely to result in harm to human health or pollution of the environment or serious breach of permit conditions and serious detriment to the amenities of the locality."

5.1.2 For all emergency situations, the deposit of any further waste will be suspended where necessary to allow action to be taken safely. If necessary, staff and other users of the site will be evacuated to an area which is a safe distance away from the hazards. Staff handling the emergency will be provided with and trained to use the necessary PPE (personal protective equipment) unless the manager instructs them that the hazard is too severe and outside help is needed from the emergency services or specialist waste contractors. A visitor's book will be kept to check who is on site at all times.

5.2 Fire

5.2.1 No waste will be burnt on site other than in plant specifically designed for the purpose and in accordance with the relevant statutory instruments. In the event of a fire occurring on site, the operator/site supervisor will exercise his judgement and extinguish the fire with the water hose or suitable fire extinguisher and/or call the fire service for assistance. Any fires will be reported to the Environment Agency on the working day that they occur and will be confirmed in writing by fax or letter within 3 working days. All staff will be evacuated from the site if necessary.

5.2.2 For quick reference, the following actions will be taken when fire is detected or suspected (Site operatives):

a) DON'T PANIC
b) RAISE THE ALARM (IF NOT DONE SO ALREADY)
c) NOTIFY THE SITE MANAGER (IF SAFE TO DO SO)
d) **DO NOT TRY TO TACKLE THE FIRE YOURSELF UNLESS YOU ARE TRAINED IN DOING SO AND YOU ARE SURE OF THE NATURE OF THE FIRE**
e) LEAVE THE SITE AS QUICKLY AND AS ORDERLY AS POSSIBLE
f) ASSEMBLE AT THE SPECIFIED FIRE ASSEMBLY POINT WHICH IS LOCATED BY THE SITE ACCESS GATES.
g) THE SITE MANAGER OR DELEGATED OPERATIVE WILL BE IN CHARGE OF CALLING THE EMERGENCY SERVICES ON "999" AND ENSURING THAT ALL PERSONS WHO WERE WORKING ON THE SITE/WITHIN BUILDINGS ARE ASSEMBLED SAFELY
h) INFORM ALL NEIGHBOURING PREMISES WHO ARE LIKELY TO BE AFFECTED
i) INFORM THE ENVIRONMENT AGENCY
j) DO NOT RETURN TO THE SITE UNTIL YOU HAVE BEEN GIVEN THE "ALL CLEAR" BY THE EMERGENCY SERVICES AND THE SITE MANAGER

5.3 Breakdowns

5.3.1 In the event of plant breakdowns, alternative plant will be sourced until the existing plant is repaired to prevent potential over stockpiling of waste. If an alternative plant cannot be used then waste will be stored securely until the plant is repaired and if necessary, waste will be diverted to an alternative site. The repair will be carried out at the most convenient location with absorbents used to clear oil or fuel spillages.

5.3.2 Essential spares for plant maintenance are kept on site to ensure a repair can be carried out efficiently.

5.4 Spillages

5.4.1 Fuel which may be stored on site will be contained within a bunded receptacle/container to contain any primary leaks. If any oil and vehicle maintenance

chemicals are kept on site, they will be stored securely. In the event of a spillage a spill containment kit (absorbent pads, booms or granules) will be used to prevent further spillage and the contaminated absorbents placed in a skip for disposal to a suitably permitted facility.

5.4.2 Any wastes which would be classified as having the potential to cause polluting runoff are stored within the concrete area which is a sealed drainage system.

5.4.3 All site surfaces will be inspected daily for the presence of spillages when the site is in operation. Debris will be swept as required and placed in a skip for further processing on site and sent to a suitably permitted site.

5.4.4 All wastes liable to give rise to contamination will be removed from the site within an EA agreed timescale.

5.5 Drums

5.5.1 The deposit of drummed waste will not be allowed at the site. If a drum is concealed within a skip and is not observed until the skip is deposited in the waste transfer area then the following procedure will apply:

a) The staff member will visually check the condition of the drum from a safe distance, noting any labels referring to the possible contents or hazards.
b) The site manager will be contacted to verify the observations and to decide on further action.
c) The producer of the waste and the EA will be contacted for advice and further information if necessary and both will be informed that a breach of the Duty of Care and site permit conditions has occurred as the result of the unauthorised deposit.
d) No further waste will be deposited until the emergency has been dealt with.
e) All spillages will be cleared using a spill containment kit and all contaminated absorbents placed in a skip for disposal to a suitably permitted waste management site.

f) If the deposit results in serious reactions with other waste or harmful emissions or the drum contents cannot be identified, then the emergency services and/or specialist waste contractors will be brought in to assist. If necessary, staff will be evacuated from the site or to a safe area within the site and all occupants of neighbouring properties will be informed.

5.6 Adverse Reactions

5.6.1 No wastes are accepted which will react to present such a hazard. If unauthorised waste is found in a load and does present such a hazard the same procedures as for the deposit of drums (above) shall apply.

5.7 Staff Shortages

5.7.1 In the event of unforeseen staff shortages arising from illness, suspension or no shows, the operator will make a judgement whether to reduce the number of incoming loads and divert material to an alternative site. The operator will then seek further employment within a timely manner to ensure the site can continue to operate at its required capacity.

5.8 Adverse Weather Conditions

5.8.1 **High winds** - There will be no sorting, processing or treatment of any wastes which are likely to be blown around during conditions of high winds. Vehicles leaving the site will be sheeted to comply with the requirements of the Duty of Care legislation.

5.8.2 **Poor visibility** - The site will not operate in conditions of poor visibility such as dense fog to reduce the risk of vehicle collision.

5.8.3 **Droughts / warm weather** - The site would source further dust suppression equipment such as bowsers, dust cannons if dust became a nuisance due to these weather conditions.

5.8.4 **Long periods of rainfall or flood events** – Due to the site's surface and potential for

mud tracking off site, all vehicles will undergo a more stringent check and vehicle chassis would be sprayed using hoses to reduce the risk of mud tracking off site. If this isn't suitable, the operator would source a road sweeper until weather conditions improve.

5.8.5 The operator will set up a notification alert with the Met Office to receive prior notifications of the above unforeseen adverse weather conditions to ensure mitigation can be put in place prior to the event. The site may be forced to close during events which could cause a significant risk to staff, human health or the environment.

5.9 Operational Failure

5.9.1 The manager will be contacted by staff in the event of any operational failure such as the breakdown of plant, systems or equipment and will decide whether operations are to continue or be suspended prior to corrective action being taken. Serious operational failures, which result in the closure of the site, will be recorded in the site diary.

5.10 Bomb Scare

5.10.1 In the unlikely event of a bomb scare, the site will be evacuated, and the police contacted. The police will then assume control of the site until the threat has been verified or the device defused and removed. The EA will be kept informed of the events on site.

6 Training for Site Staff

6.1 Training Needs Assessment

6.1.1 All new and existing site staff are subject to a specific training regime based on their responsibilities at the site to ensure all operations are carried out without harm to the environment or amenity of the surrounding area. Training in all aspects of the site and waste operations at the site with regard to the individual responsibilities of the site staff will help to prevent incidents occurring which may have an adverse impact on the environment and/or the employees and their co-workers.

6.1.2 An employee training record will be available at the site detailing information similar to STL/RF/6 in Appendix II and shall provide a comprehensive checklist for the training needs of all new site staff and also serves as a training review for existing site staff which will be carried out annually or a period set at the operator's preference.

6.2 Site Rules and Infrastructure Training

6.2.1 This information is provided to all employees, visitors and contractors with a full understanding of the site's conditions of use, which is communicated and documented at induction for all staff with specific induction for visitors and contractors.

6.2.2 Competency should be demonstrated within this field to ensure the employee is fully aware of the site's surroundings and operations to ensure their safety and compliance with specific operating conditions at the site.

6.3 Emergency Procedures Training

6.3.1 All employees are required to be familiar with the Environmental Controls in Section 4.0 and the Emergency Procedures as detailed in the Section 5.0.

6.3.2 In addition to normal operating conditions as specified in the site rules, employees must also be trained in dealing with eventualities which may occur outside the scope of normal operating conditions, so they are aware of how to deal with these situations

in advance of an occurrence.

6.4 Fire Safety/Firefighting Training

6.4.1 Management must provide all employees with appropriate fire safety training with regard to their individual responsibilities.

6.4.2 Emergency procedures detailing what measures employees should adopt should a fire occur at the site are detailed in Section 5.2 and are covered by the 'emergency procedures' training (see Section 6.3).

6.4.3 Regular fire drills will be undertaken by site management to ensure proper procedures are followed by employees in the unlikely event that a fire incident occurs**.** These will be unannounced drills and will not form part of the induction or review training as specified in Section 6.1.

6.5 Recognition of Waste Types Training

6.5.1 All employees will be given induction training and subsequent regular training to identify those waste types which are permitted for acceptance at the site under the site EP and those wastes which are not. This will include specific training to identify those common wastes which may be found following deposit and are not permitted at the site and will also include more obscure wastes and how to handle these wastes safely. All employees will be advised that they should refer any unrecognisable or unknown wastes to senior management, who should, in turn, follow procedures outlined in the EMS and/or contact the EA to agree a suitable method for removal.

6.5.2 Training will be provided to all site users who handle waste on site and those in charge of administration and reporting. In-depth training will also be provided to drivers responsible for collecting wastes from the site of production in accordance with Section 3.0. They will be trained to identify any wastes not covered by the EP for the site and inform the producer that an alternative facility must be sought for any non-compliant wastes.

6.6 Storage Areas/Limits Training

6.6.1 Those employees who carry out their responsibilities at the site and those in senior posts must be trained to identify appropriate waste storage areas to ensure that waste storage operations comply with the requirements of the EP for the site.

6.6.2 Employees in these roles must also be trained to recognise storage limits to ensure that they are in accordance with those specified in Section 1.6.

6.7 Vehicle/Plant Preventative Maintenance Training

6.7.1 This training will be provided specifically for the vehicle and plant operators in order to ensure that all plant and machinery is checked regularly to prevent any occurrences which may lead to any adverse impacts on the environment or human health.

6.7.2 Training will be in accordance with this document and will be based on the preventative maintenance schedule supplied by the plant/equipment manufacturer.

6.7.3 The same training will be provided to senior management enabling a dual-level maintenance programme.

6.8 Duty of Care Training

6.8.1 All employees dealing with consignments of waste will be trained in the completion of Duty of Care Waste Transfer Notes and the appropriate auditing of destination sites and/or contractors to ensure compliance.

6.9 Plant Operation Training

6.9.1 Any employees who are required to operate loading or treatment plant for the movement or processing of waste will be required to undertake the necessary qualifications for the operation of the specific item of plant in question. This will be required prior to operating the plant and will be obtained through necessary external certification programmes.

6.9.2 Regardless of general plant operation certification, all operatives will be fully inducted in the operation of the specific make and/or model of plant used on site.

6.10 Permit/Management System

6.10.1 All employees will be inducted into the operating conditions as prescribed in the EP for the site. Whilst much of the above training will provide specific guidance on many aspects of these documents, all employees will be made aware of the location of the EP and EMS in the site office. All managerial positions will be made fully aware of the sites operating conditions.

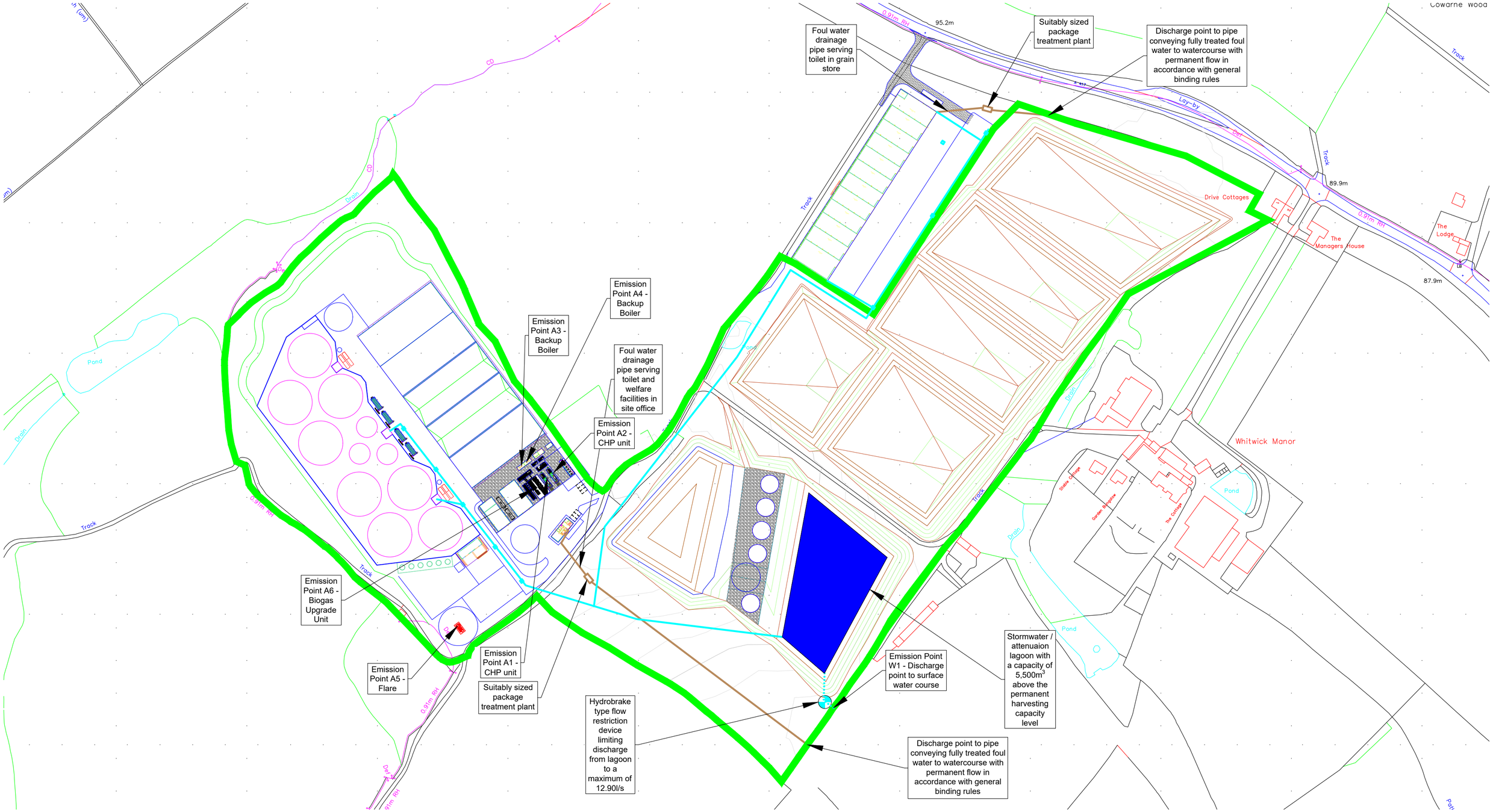
6.11 Training for Contractors

6.11.1 General site training will be provided to any contractors who are working on the site on a temporary basis as described in Sections 6.2, 6.3 and 6.4 above.

6.11.2 Additional training will be provided to contractors in their area of expertise. If they are dealing with specific items of plant/machinery, site operating conditions and a general understanding of the EP conditions will be provided to prevent any adverse impacts on the environment.

Appendix I

Drawings



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DRAWING TITLE
SITE DRAINAGE PLAN

CLIENT
STL Energy Ltd

PROJECT/SITE
Whitwick Manor, Lower Eggleton, Herefordshire, HR8 2UE

SCALE @ A2	CLIENT NO	JOB NO
1:2,000	2102	006

DRAWING NUMBER	REV	STATUS
2102-006-02	B	Issued

DRAWN BY	CHECKED	DATE
CG	-	27.04.23

KEY:

- Site boundary
- 575mm diameter HDPE pipe with fall of at least 1 vertical in 50 horizontal
- 150mm diameter HDPE pipe with fall of at least 1 vertical in 50 horizontal

NOTES

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	25.11.22	CG	Initial drawing
A	28.11.22	CG	Minor amendment
B	27.04.23	IA	Boundary amendment

Key

1. Digester Tank 1
2. Digester Tank 2
3. Feed Stock/Water Storage Tank
4. Secondary Tank 1
5. Pasteuriser Tank
6. Hydrolyser Tank
7. Ammonia Recover Tank
8. Pump Room
9. Feeders
10. Vehicle Turning
11. Open Feed Stock Storage Clamps
12. Covered Feed Stock Storage Clamps
13. Open Feed Stock Storage Clamps
14. Process Containers & Tank
15. Secondary Tank 2
16. Digester Tank 3
17. Storage Tank
18. Digester Tank 4
19. 6 x Nitrogen & Phosphate Bunded Recovery Tanks
20. Control Room
21. Solids Recovery Separator & Centrifuge
22. Flare
23. Dry Ice Plant & Control Room
24. 4 x CO2 Tanks
25. CO2 Plant
26. Bio Methane Plant
27. 2 x CHP's
28. 6 x Propane Tanks
29. Chiller Units
30. 2 x Back up Boilers
31. NEF Unit
32. Compressor Unit
33. Office & Welfare Building
34. Weighbridge
35. Storm Water Lagoon
36. Process Water Lagoon
37. Reed Beds
38. Grain Store
39. Site Access
40. Gas Pipe to Grid
41. Tank Bund
42. Phosphate stripping and polishing tanks
43. Wash down & wheel wash area

Rev No.	Revision Note.	Date	Drawn	Checked
A	Pre App Drawings	12.11.19	AW	AW
B	Wetlands system added to the site	01.04.20	AW	AW
C	Grain Store updated	02.10.20	CJB	AW
D	Red line site amended	07.09.22	AW	AW
E	Grain store and storage building revised	28.03.23	AW	AW

NUMBER - REV - CLIENT - PROJECT
01113-00 – E – N Layton – Whitwick Manor

TITLE
Site Plan

DATE	SHEET	SCALE
08.08.22	02	1:1000
DRN BY AW	CHK BY AW	PAPER SIZE A1

BOURNE VALLEY ASSOCIATES
ANDOVER LANE FARM
FABERSTOWN
ANDOVER
HAMPSHIRE
SP11 9PE
Tel: 01264 850159
Email: info@bournevalley.co.uk

Appendix II

Record Keeping Forms

STL ENERGY LTD

WASTE INPUT RECORD FORM - STL/RF/1 **DATE: .....**

TIME	PRODUCER/SOURCE	WASTE TYPE	QUANTITY IN TONNES / m^3	NAME OF CARRIER	DRIVERS NAME	DRIVERS SIGNATURE	VEHICLE REG. NO.	WASTE ACCEPTED/ INSPECTED BY
TOTAL FOR THIS SHEET								
TOTAL FROM PREVIOUS SHEET				SHEET No. OF . CHECKED.....				
TOTAL WASTE DEPOSITED								

STL ENERGY LTD

REJECTED WASTE - RECORD FORM STL/RF/2

DATE	
TIME	
WASTE DESCRIPTION	
QUANTITY OF WASTE	
PRODUCER/HOLDER'S NAME, ADDRESS & TELEPHONE No.	
NAME OF CARRIER	
VEHICLE REGISTRATION	
CARRIER REG. No.	
REASON FOR REJECTION OF WASTE	
ACTION TAKEN	

STL ENERGY LTD

WASTE AND PRODUCT OUTPUT RECORD FORM - STL/RF/3 **MONTH.....**

DATE	TIME	WASTE TYPE	QUANTITY (TONNES)	DESTINATION SITE	NAME OF CARRIER OR EMPLOYEE REMOVING WASTE	VEHICLE REG. NO.
TOTAL FOR THIS SHEET						
TOTAL FROM PREVIOUS SHEET				SHEET No. OF . CHECKED.....		
TOTAL WASTE EXPORTED						

STL ENERGY LTD

SITE INSPECTION FORM (DAILY INSPECTIONS) – STL/RF/4

WEEK STARTING							
TYPE OF INSPECTION	**DAY**						
	M	**T**	**W**	**T**	**F**	**S**	**S**
SITE ENTRANCE/NOTICE BOARD							
SECURITY - GATES							
SECURITY - FENCING							
SITE ROADS / SURFACES							
WASTE CONTAINERS & BAYS							
WASTE STORAGE							
SKIP STORAGE							
PLANT/EQUIPMENT							
FUEL TANK/BUND							
CONCRETE HARDSTANDING							
WASTE TYPES/ QUANTITIES							
REJECTED WASTE TYPES / STORAGE							
NOISE LEVELS							
FIRES							
LITTER							
DUST							
ODOUR							
VERMIN							
RECORDS							
COMPAINTS RECEIVED							
OTHER -							
INSPECTION CARRIED OUT BY							

NOTES/ACTION (CONTINUE ON A SEPARATE SHEET IF NECESSARY):

CHECKED BY		**SIGNATURE**	
POSITION		**DATE**	
Sheet		***of***	

STL ENERGY LTD

SITE INSPECTION FORM (DAILY INSPECTIONS) –STL/RF/4

NOTES/ACTION (CONTINUATION SHEET):

CHECKED BY		**SIGNATURE**	
POSITION		**DATE**	
Sheet		***of***	

STL ENERGY LTD
EMPLOYEE TRAINING NEEDS ASSESSMENT / REVIEW - STL/RF/6

EMPLOYEE NAME					**DATE**					
POSITION					**REVIEW DUE**					
TRAINING CARRIED OUT BY										
POSITION										
TRAINING REQUIRED	**GENERAL OPERATIVES**		**HGV DRIVER**		**SITE MANAGER/ OPERATOR**		**ADMIN STAFF**		**TECHNICALLY COMPETENT MANAGER**	
CARRIED OUT?	Y/N	SIGNED BY EMPLOYEE	Y/N	SIGNED BY EMPLOYEE	Y/N	SIGNED BY EMPLOYEE	Y/N	SIGNED BY EMPLOYEE	Y/N	SIGNED BY EMPLOYEE
SITE RULES AND INFRASTRUCTURE										
EMERGENCY PROCEDURES										
FIRE SAFETY/ FIRE FIGHTING										
RECOGNITION OF WASTE TYPES										
STORAGE AREAS/LIMITS										
RECORD KEEPING										
VEHICLE CHECKS (Preventative Maintenance)										
PLANT CHECKS (Preventative Maintenance)										
DUTY OF CARE WASTE TRANSFER NOTES										
PLANT OPERATION - LOADING PLANT										
MOBILE PLANT AND MACHINERY										
MANAGEMENT SYSTEM & PERMIT										
OTHER 1 (PLEASE SPECIFY)										
OTHER 2 (PLEASE SPECIFY)										

STL ENERGY LTD
COMPLAINTS REPORT FORM (STL/RF/7)

Date Recorded:	Reference Number:
Name and address of caller	
Telephone number of caller	
Time and Date of call	
Nature of complaint (noise, odour, dust, other) (date, time, duration)	
Weather at the time of complaint (rain, snow, fog, etc.)	
Wind (strength, direction)	
Any other complaints relating to this report	
Any other relevant information	
Potential reasons for complaint	
The operations being carried out on site at the time of the complaint	
Follow Up	
Actions taken	
Date of call back to complainant	
Summary of call back conversation	
Recommendations	
Change in procedures	
Changes to Environmental Management System (EMS)	
Date changes implemented	
Form completed by	
Signed	
Date completed	

COMPLAINT RECORDING PROCEDURE:

1) Any complaints received will be recorded on form STL/RF/7. This form will normally be completed, signed and dated by the Site Manager; if they are not available the Office Manager will complete the form.

2) The name, address and telephone number of the caller will be requested.

3) Each complaint will be given a reference number.

4) The caller will be asked to give details of:

    a. the nature of the complaint;
    b. the time;
    c. how long it lasted;
    d. how often it occurs;
    e. Is this the first time the problem has been noticed; and
    f. what prompted them to complain

5) The person completing the form will then, if possible, make a note of:

    a. the weather conditions at the time of the problem (rain, snow, fog etc.)
    b. strength and direction of the wind; and
    c. the activity or activities taken place on the site at the time the noise was detected, particularly anything unusual.

6) The reason for the complaint will be investigated and a note of the findings added to the report.

7) The caller will then be contacted with an explanation of the source of the complaint if identified and the action taken to prevent a recurrence of the problem in future.

8) If the caller is unhappy about the outcome or unwilling to identify themselves the caller will be invited to contact the Environment Agency and or the Local Authority.

9) Following any complaint the relevant management plan(s) will be reviewed to ensure appropriate actions are in place to counter any problems.

Appendix III

Accepted Waste Types (European Waste Catalogue Waste Code List)

Permitted EWC Codes

Permitted waste types and quantities	
Maximum Quantities	**The total quantity of waste accepted for activity shall be less than 83,000 tonnes a year.**
Waste Code	**Description**
02	**Wastes resulting from exploration, mining, quarrying and physical and chemical treatment of minerals**
02 01	**waste from agriculture, horticulture, aquaculture, forestry, hunting and fishing**
02 01 01	sludges from washing and cleaning − vegetables, fruit and other crops (including wastes accepted in accordance with RPS 241)
02 01 03	plant tissue waste (including wastes accepted in accordance with RPS 241)
02 01 06	animal faeces, urine, manure (including spoiled straw) only (including wastes accepted in accordance with RPS 241)
02 03	**wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation**
02 03 01	sludges from washing, cleaning peeling, centrifuging and separation (including wastes accepted in accordance with RPS 241)
02 03 04	materials unsuitable for consumption or processing (including wastes accepted in accordance with RPS 241)
02 03 05	sludges from on-site effluent treatment (including wastes accepted in accordance with RPS 241)
02 04	**wastes from sugar processing**
02 04 03	sludges from on-site effluent treatment (including wastes accepted in accordance with RPS 241)
02 05	**wastes from the dairy products industry**
02 05 01	materials unsuitable for consumption or processing (including wastes accepted in accordance with RPS 241)
02 05 02	sludges from on-site effluent treatment
02 06	**wastes from the baking and confectionery industry**
02 06 01	materials unsuitable for consumption or processing (including wastes accepted in accordance with RPS 241)
02 06 03	sludges from on-site effluent treatment (including wastes accepted in accordance with RPS 241)
02 07	**wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)**
02 07 01	wastes from washing, cleaning and mechanical reduction of raw materials (including wastes accepted in accordance with RPS 241)
02 07 02	wastes from spirits distillation (including wastes accepted in accordance with RPS 241)
02 07 04	materials unsuitable for consumption or processing (including wastes accepted in accordance with RPS 241)
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 06	**wastes from anaerobic treatment of waste**
19 06 03	liquor from anaerobic treatment of municipal waste
19 06 04	digestate from anaerobic treatment of municipal waste
19 06 05	liquor from anaerobic treatment of animal and vegetable waste

Permitted waste types and quantities	
Maximum Quantities	**The total quantity of waste accepted for activity shall be less than 83,000 tonnes a year.**
Waste Code	**Description**
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 08	**wastes from wastewater treatment works**
19 08 09	grease and oil mixture from oil/water separation containing only edible oils and fats

#

Appendix IV

Health & Safety – Conditions of Site Use

HEALTH AND SAFETY - CONDITIONS OF SITE USE

The following guidelines apply to all site personnel, contractors and visitors using the site (where applicable).

1) The site is covered by the Health and Safety at Work Act 1974 and its associated regulations and all users must abide by any relevant provisions. Any person found to be in contravention of the requirements of this Health and Safety Statement will be asked to leave the site.

2) All visitors and contractors must sign the visitor's book upon entry to and exit from the site. All vehicle drivers must report to the site office and await instruction from the site manager/deputy before proceeding to deposit waste at the site.

3) All accidents, diseases, injuries or dangerous occurrences shall be reported to the site manager. All instructions issued by the site manager in respect of health and safety at the site must be followed by all site users.

4) A first aid box (including eye-wash bottles) is kept in the site office. If you are injured on site please alert a member of staff/trained first-aider for assistance.

5) All persons must wear the appropriate PPE on site including high visibility jackets and hard hat.

6) Safety boots must be worn by all persons in the waste sorting/storage areas.

7) Protective gloves must be worn for any operations which present a hazard of puncture to or laceration of the skin or for any manual handling work carried out on site.

8) Ear defenders, safety helmets (hard hats) and eye protection will be issued when deemed necessary and must be worn by all employees and contractors where required by the site manager or other site representatives.

9) Fire extinguishers are kept on site to deal with any fires - fires shall only be dealt with by employees of STL Energy Ltd unless alternative instructions are given by the site manager. Access to fire exits and fire fighting equipment must be kept clear at all times. When the fire alarm sounds please follow instructions and leave the site in an orderly fashion.

10) Persons who are suspected to be under the influence of drugs or alcohol will be removed from the site.

11) Smoking is not permitted on the site.

12) Observe and follow all traffic directions and traffic/safety signs.

13) Drivers must comply with all safety instructions given by the site manager or appointed deputy.

14) All drivers are responsible for ensuring that their vehicle is safely loaded. Unsafe loads will not be accepted at the site and will not be allowed to leave the site until they have been made safe.

15) Drivers waiting to tip at the recycling centre shall follow the instructions of the operator and shall only tip in the designated area, unless advised otherwise.

16) Drivers must remain in the cab or stand well clear of the vehicle during loading or tipping. Once the vehicle has been loaded it must be securely sheeted (if necessary) before leaving the site. When sheeting and unsheeting the vehicle ensure that the engine is switched off, the ignition key removed and the parking brake is on. Do not gain access using the mudguards and wheels. Ensure that your ropes, hooks and sheets are in good condition.
17) Never travel with the vehicle body raised. Ensure you know the maximum height of the raised body of your vehicle.

Declaration: To be completed by site users

I have read and understand the conditions of use for this site and agree to comply with them at all times. I accept that neither STL Energy Ltd nor their employees shall be liable for any loss or injury arising from my non-compliance with the above conditions.

Signed..... Print name.....

Company/Organisation..... Date.....

Note: these conditions are included in the EMS for information only and may be revised regularly as part of the site health and safety policy.

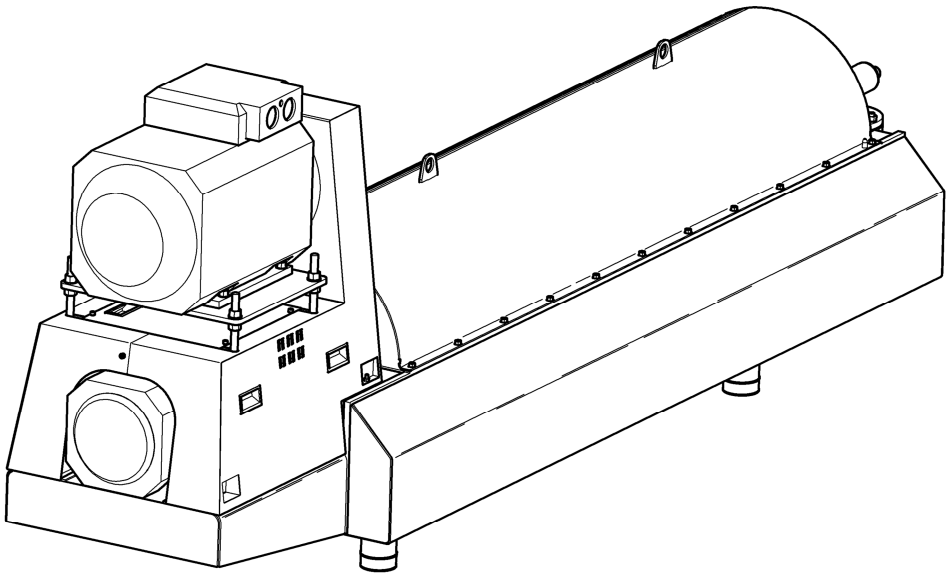
Appendix V

Maintenance Schedules

Lubrication and maintenance schedule

Type .CF 46.-..-.5

No. 8410-3001-081 | Edition 19.06.2015



Max. product temperature (°C)	**80**
Lubricant gear	**WS-0013**
Lubricant bowl bearing	**WS-0132**
Lubricant scroll bearing (liquid side)	**WS-0129**
Lubricant scroll bearing (solid)	
Other lubricants	

1 Safety precautions

1.1 Important notes on maintenance

Regular maintenance of the centrifuge is crucial in terms of service life, safety and operating readiness.

Failure to carry out regular maintenance will result in increased wear, poorer product quality and higher energy consumption.

Increased wear reduces the stability of the components and can lead to severe damage to bowl and drive. This damage can in turn result in high risks for life and limb of the personnel as well as damage to property.

Observe the following points to avoid hazards:

- Observe the specified maintenance intervals.
  When a service and maintenance contract is concluded with GEA Westfalia Separator Group, the maintenance work is optimally adapted to the production process. This can substantially lower maintenance costs.
- The maintenance intervals apply for standard applications. In the case of increased stress caused by special operating conditions, special products or hot operating conditions, shorten the service intervals in consultation with GEA Westfalia Separator Group service.
- If damage is detected during an inspection, replace the damaged elements immediately by original spare parts from GEA Westfalia Separator Group.
- If problems arise during maintenance work, consult GEA Westfalia Separator Group or take advantage of the training opportunities. See "Qualification of the personnel" and "Service and training".
- Following unusual events which may have a negative impact on safety, check the centrifuge immediately. Unusual events can be, for example, accidents or natural phenomena such as earthquakes, sand storms and flooding.

Use in explosion-hazarded zones

When operating the decanter in an explosion-hazarded zone, additional service and maintenance work is required which exceeds the scope described in this document.

The required operations are described in the corresponding manual for the ATEX decanter. For example, additional maintenance is required on the gear.

1.2 Application

This document applies for all persons who work with or on the centrifuge.

It is applicable for the plant operator as a basis for creating standard operating procedures for conduct at the workplace at the centrifuge.

1.3 Requirements to be met by spare parts and consumables

Spare parts, wear parts and consumables can cause damage to persons and property if they do not meet the requirements.

Original spare parts and consumables from GEA Westfalia Separator Group satisfy all pre-conditions for the operating safety of the centrifuge.

- Use only original spare parts.
- Use only original operating materials.
- Use the order-specific spare parts catalog supplied.
- See the chapter "Spare parts" for ordering spare parts and consumables.
- Keep to the limit values.

1.4 Target groups

The target groups for this documentation are all persons involved in installing, assembling, operating, maintaining and repairing the centrifuge.

What work may be carried out by what target group depends on the qualification of the personnel and on the type of work.

In the tables in the chapters **Troubleshooting** and **Maintenance** the responsible target group as well as the operation is specified.

1.4.1 Operator

Abbreviation: Op

The operator is employed by the customer and has been briefed in the following operations:

- Starting and shutting down the machine.
- Monitoring the machine and process (e.g. by means of indicators).
- Execution of easy re-lubrication and cleaning operations.

When given specific directions, the operator is able to carry out simple modifications to the process, e.g.:

- Adjusting temperatures, pressures and throughput capacities.
- Dosing additives.

1.4.2 Skilled worker

Abbreviation: Skilled

The skilled worker is normally employed by the customer and has been briefed in the following areas:

- Performing easy assembly work
- Performing routine maintenance work or servicing
- Limited settings and parametrization on the components and control system

The skilled worker has basic technical knowledge. The basic knowledge corresponds to a technical apprenticeship (mechanical or electrical).

The skilled worker is selected and deployed by the employer (plant operator).

GEA Westfalia Separator will carry out the briefing only in specific technical features that are part of the supply schedule and and will indicate potential hazards.

This briefing is no substitute for an apprenticeship.

1.4.3 Trained specialist

Abbreviation: Tspec

The trained specialist normally belongs to the service team of GEA Westfalia Separator Group.

In exceptional cases, skilled workers employed by the customer can obtain a corresponding qualification by attending training courses held by GEA Westfalia Separator Group.

1.5 Service offers

1.5.1 Training

GEA Westfalia Separator regularly holds training courses for customer employees.

The training content is aimed at the operating and service personnel of the customer who work with the centrifuge. The operator must know how the centrifuge functions.

Trained operators assure the operating safety of the centrifuge.

Many different applications require competent process engineering know-how. Only adequately trained employees in service ensure a high quality standard. This requires ongoing further training.

The demands on the qualification of the service staff are growing increasingly. GEA Westfalia Separator consequently offers a qualification model and training concept.

Contact the following addresses for training courses for operating and service staff.

- GEA Westfalia Separator Group GmbH • Werner Habig Straße 1 • 59302 Oelde (Germany) • Tel. +49 (0)2522 77-1469 • Fax +49 (0)2522 77-31469 • ws.techtraining@gea.com • www.gea.com
- GEA Westfalia Separator Systems GmbH • Am Neuländer Gewerbepark 6 • 21079 Hamburg (Germany) • Phone +49 40 589650-0 • Fax +49 40 7380585 • wshh-service@gea.com • www.westfalia-separator.com

1.5.2 Service

GEA Westfalia Separator offers comprehensive service for the following areas:

- Assembly
- Commissioning
- Regular maintenance
- Repairs
- Checking the operating state
- Checking in dismantled state
- Decommissioning for a long-term shut-down
- Storage and conservation during long-term standstill
- Restarting
- Decommissioning and disposal
- Training

1.6 Additional documentation

Request further information and technical documentation from the following places:

- Directly from GEA Westfalia Separator in Oelde.
- From the nearest representative of GEA Westfalia Separator.
- Per Internet under: www.westfalia-separator.com
- Vie e-mail at: wsinfo@gea.com

2 Maintenance schedule

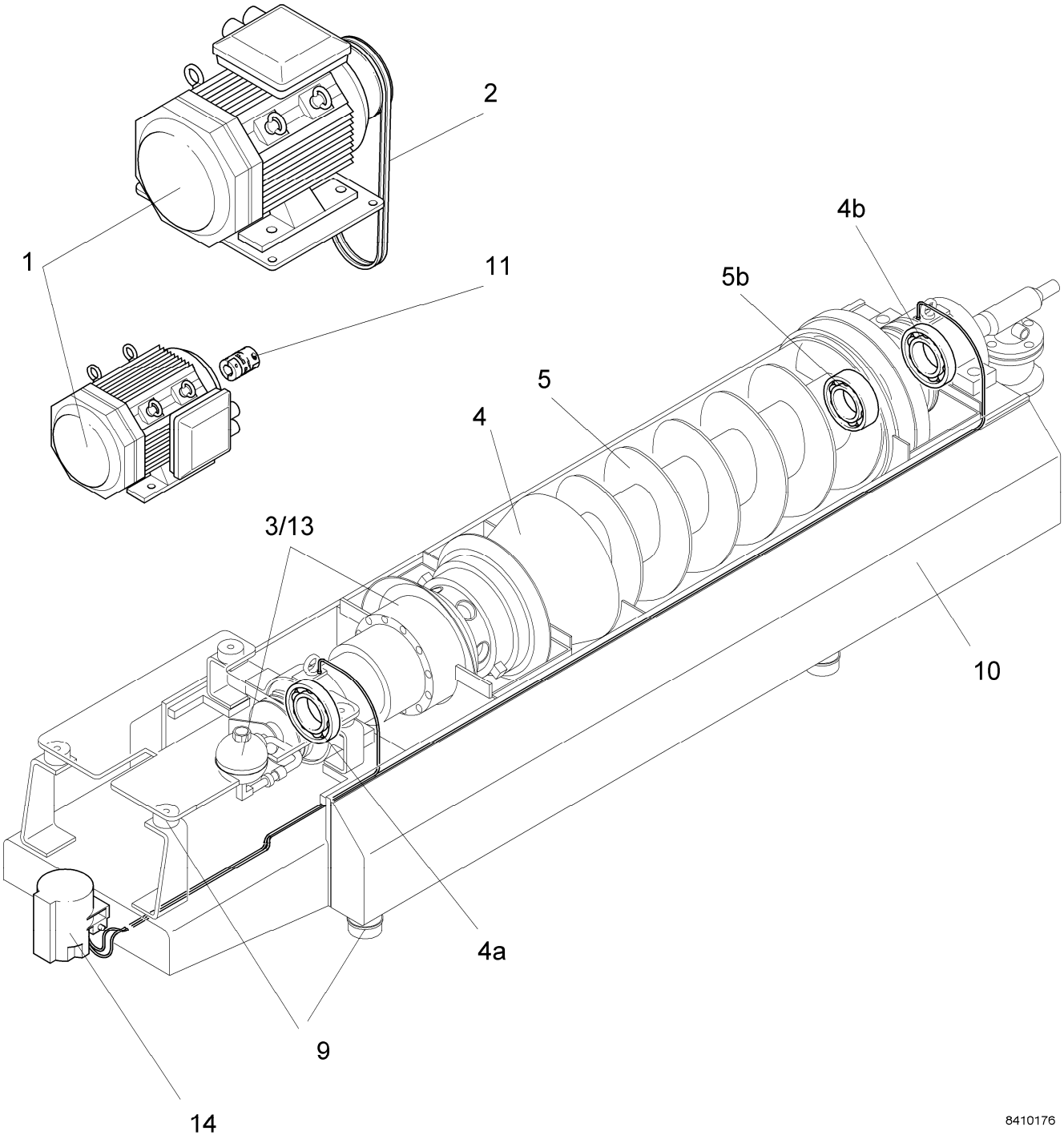


Fig. 1

2.1	After/during 1st Commissioning		
	Machine part	**Action**	**Operator**
2	Drive belt	➢ The 1 time, check the belt tension after 0.5 - 1 operating hours. ➢ The 2 time, check the belt tension after 8 - 24 operating hours. Refer to the manual.	Skilled
10	Complete decanter	➢ Check the installation for leakage.	Skilled
13	Surge reservoir / gear lubrication	➢ Check the oil level in the surge vessel. Lubricant: **WS-0013**	Op
14	Optional: Automatic grease lubrication of the bowl bearings	➢ Check the setting in the decanter control and adapt it to the working pr°Cess if necessary. - The grease quantity may be regulated only by altering the "pause time" on the decanter control. - Factory setting = 3000 s - 0.2 g grease are conveyed to each bowl bearing during each lubrication interval. - Minimum lubrication quantity = 6 g per day and bowl bearing. Refer to the manual of the automatic grease lubrication.	Skilled

Op = Operator / Skilled = Skilled worker / Tspec = Trained specialist

2.2	After the first 500 operating hours		
	Machine part	**Action**	**Operator**
3	Gearbox	➢ Fill in new oil. Lubricant: **WS-0013** Lubricant quantity: **6.5 litres** Refer to the manual.	Skilled

2.3	Daily		
	Machine part	**Action**	**Operator**
4a:	Bowl bearings / solids side	➢ Re-lubricate roller bearings. ➢ Refer to the instruction manual. Lubricant: **WS-0132** Lubricant quantity 6 g per bowl bearing 2 g correspond to one stroke with the lever-type hand gun 0003-0429-000. Notes on re-lubrication in special operating conditions: • Under extreme conditions, re-lubricate every 8 hours with 3 g (e.g. with 24 h/day operation). • In the case of short-time operation, re-lubricate after 4 operating hours at the earliest.	Op
4b	Bowl bearings / liquid side		
10	Complete decanter	➢ Check running characteristics. ➢ Shut down the decanter when unusual noises or vibrations occur.	Op
13	Surge reservoir / gear lubrication	➢ Check the oil level in the surge vessel. Lubricant: **WS-0013**	Op

Op = Operator / Skilled = Skilled worker / Tspec = Trained specialist

2.4	Monthly		
	Machine part	**Action**	**Operator**
14	Optional: Automatic grease lubrication of the bowl bearings	➢ Top up the storage tank of the automatic grease lubrication. ➢ Check grease lines. Lubricant: **WS-0132** Lubricant quantity: 400 g Refer to the automatic grease lubrication manual.	Op

2.5	Every 2000 operating hours, after 6 months at the latest		
	Machine part	**Action**	**Operator**
2	Drive belt	➢ Check condition and belt tension. Refer to the decanter manual (chapter "Tensioning drive belts).	Skilled

Op = Operator / Skilled = Skilled worker / Tspec = Trained specialist

2.6	Every 4000 operating hours, after 12 months at the latest		
	Machine part	**Action**	**Operator**
4	Frame	➢ Clean grease collecting chambers.	Skilled
3	Drive shafts / gear	When using the decanter in explosion-hazarded areas: ➢ Replace the service kit “Drive shaft, complete”.	Tspec
		When using the decanter in non-explosion-hazarded areas: ➢ Renew gaskets. - Recommendation: Replace the service kit “Drive shaft, complete”.	
3	Gearbox	➢ Fill in new oil. Lubricant: **WS-0013** Lubricant quantity: **6.5 litres** Refer to the manual.	Skilled
9	Vibration isolators / frame	➢ Check the vibration absorbers for any changes. Replace the vibration absorbers in the case of the following abnormal signs: • Cracks • Deformations • Discoloration Defective vibration absorbers may cause substantial follow-up damage.	Skilled
9a	Vibration isolators / drive		
11	Coupling / drive	➢ Check the rubber elements for changes. Replace the rubber elements in the case of the following abnormal signs: • Cracks • Deformations • Discoloration	Skilled
	Optional: Lifting devices / set of tools	➢ Carry out visual check for damage. ➢ Replace damaged tools immediately.	Skilled
	Optional: Vibration pickup	➢ Check vibration guard for proper functionality. The functional check is done by lowering the limit value temporarily while the machine is running.	Skilled

Op = Operator / Skilled = Skilled worker / Tspec = Trained specialist

2.7	Every 8000 operating hours, after 3 years at the latest		
	Machine part	**Action**	**Operator**
2	Drive belt	➢ Replace the drive belt. Refer to the operating instructions for the decanter.	Skilled
3	Driven shaft / gear-box	➢ Renew gaskets.	Tspec
4	Bowl	➢ Replace both bowl bearings and all gaskets.	Tspec
	Bowl bearings / solids side	➢ Pack the roller bearings with grease. Lubricant: **WS-0132** Lubricant quantity: **120 g**	
	Bowl bearings / liquid side	➢ Pack the roller bearings with grease. Lubricant: **WS-0132** Lubricant quantity: **270 g**	
5b	Scroll bearing / liquid side	➢ Replace the scroll bearings and all gaskets. ➢ Pack the roller bearings with grease. Shorter intervals may be necessary. Lubricant: **WS-0129** Lubricant quantity: **270 g**	Tspec

2.8	Every 16000 operating hours, after 3 years at the latest		
	Machine part	**Action**	**Operator**
3	Gearbox	➢ Have the gearbox inspected by GEA Westfalia Separator. Consulting is done by GEA WS service or GEA WS branch-es. Other intervals may be necessary in the case of long standstill times or very tough operating or ambient conditions. • Long standstill times are: longer than 6 months • Very tough operating or ambient conditions are, e.g. hot operation, frequent torque peaks, frequent overload of the decanter.	Skilled
9	Vibration isolators / frame	➢ Replace vibration isolators. **Does not apply** for versions with visosity dampers. The viscosity dampers are recognisable by the bellows.	Skilled
9a	Vibration isolators / drive		Skilled
11	Coupling / drive	➢ Replace the rubber elements.	Skilled

Op = Operator / Skilled = Skilled worker / Tspec = Trained specialist

2.9	Pay attention to the specifications of the manufacturer!		
	Machine part	**Action**	**Operator**
1	Drive motor	➢ Re-lubricate / replace motor bearings. ➢ Information on this is given in the manual for the motor. ➢ Deviations, if any, are specified on a rating plate on the motor. ➢ Carry out re-lubrication preferably when the motor is rotating.	Skilled

2.10	Product-dependent intervals		
	Machine part	**Action**	**Operator**
4	Bowl	➢ Check bowl shell for wear. ➢ Check protective ring for wear. ➢ Check solids clearers and wearing bushes in the area of the discharge ports for wear. When wear, damage or corrosion is detected on load-bearing bowl parts, contact the factory.	Tspec
5	Conveyor screw	➢ Check the wear to the scroll and wear liners.	Tspec
10	Complete decanter	➢ Check the decanter and the electrical components. ➢ Check the frame, catcher and product discharge for deposits. ➢ Eliminate caking.	Tspec

Op = Operator / Skilled = Skilled worker / Tspec = Trained specialist

2.11 Lubricants

Selection of a suitable lubricant is essential for correct functioning of the decanter. Wear is minimised. The service life and operating safety of the decanter is increased.

For this reason, we recommend the lubricant be filled in at the factory. GEA Westfalia Separator Group carries out continuous quality checks only for this product.

Notes on storage: The possible storage time when stored carefully in dry rooms and with closed original containers is at least 24 months.

2.11.1 Table of Lubricants

	Designation	WS - Part-No /drum.	Manufacturer
WS-0013	High-performance lubricating oil	0015-0013-000 / 2.5 litres	GEA Westfalia Separator genuineparts
WS-0129	High-pressure grease	0015-0129-010 / 0.4 kg Cartridge according to DIN 1284	GEA Westfalia Separator genuineparts
WS-0132	High-speed grease	0015-0132-000 / 0.4 kg Cartridge according to DIN 1284	GEA Westfalia Separator genuineparts
Assembly paste	Use for • Screwed connections • Toothing on the drive and driven shaft • All metallic joints	0015-0104-080 / 500 g	GEA Westfalia Separator genuineparts

2.12 Preservatives

The centrifuge/bowl will get damaged if it is not operated for a prolonged period and inadequate preservation measures are taken. This also applies for the time before commissioning.

Refer to the instruction manual.

Designation	WS Part-No.	For the following parts use
Anti-corrosion wax	6969-0022-010	• Non-lacquered parts of the frame • Gear (outside) • Motors (outside)

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This circular replaces:
2167/07

Maintenance for gas engines

Valid for: **TCG 2016, TCG 3016, TCG 2020, TCG 3020, TCG 2032, TCG 2032B**

The 8th replacement was made due to:

- Introduction of a new maintenance schedule
  - TCG 3016 Flexible operation
  - TCG 3016 Configuration PH

Contents:

- General information
- Definition of the application type
- Document code (coding)
- Assignment table
- Maintenance schedule
- Personnel
- Definition of the maintenance work
- Exchange cylinder heads as needed
- Appendix
  - Data sheet

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Date:

2021-08-28

Note:
There is no revision service for the parts numbers specified in this document. Only the spare parts documentation is binding for the identification of spare parts.

Copies to:
- TR
- According to SIT 7010

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General information

The product is intended exclusively for the contractually agreed use. Any other use, or use exceeding this, does not qualify as intended use.

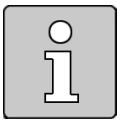
The intended use of the engine is indicated by a power code that is engraved on the rating plate.

The maintenance work required to maintain the target state and thus the operational safety is detailed in the maintenance schedule.

The maintenance intervals indicated in the maintenance schedule are maximum values, and it is presupposed that the installation, intended use and operating conditions comply with all requirements stated.

The maintenance work must be completed by specialist personnel with the corresponding competencies.

To avoid any operating faults and/or premature wear, it must be ensured that all operating media comply with the required specification. The operating media are indicated in the operating media specifications. The figures mentioned therein are binding unless otherwise specified in the system-specific contracts.



The date for shutting down the system must be scheduled in good time to ensure that maintenance work is completed in a timely manner.

Any provisional dates for shutting down the system must be agreed with the responsible service partner at an early stage. Any malfunctions which might have occurred on your genset must be reported when arranging the date.

Detailed information can be obtained from the responsible service partner.

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Definition of usage type

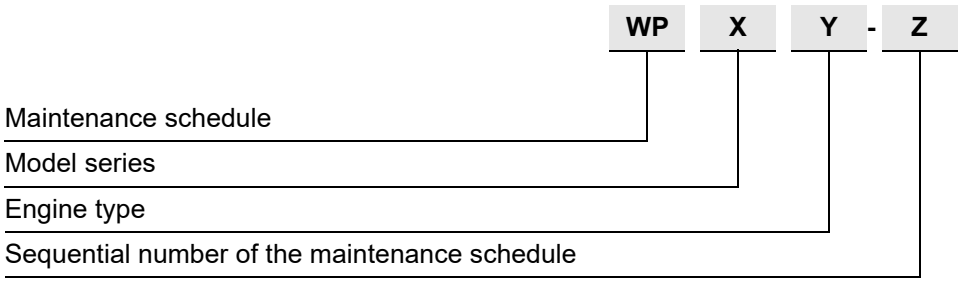
Different maintenance schedules are assigned to the engine depending on the operating mode and option.

- Continuous operation
  - more than 3000 operating hours per year **and**
  - less than 1200 engine starts per year **and**
  - more than 2 operating hours per engine start

- Flexible operation
  - less than 3000 operating hours per year **or**
  - more than 1200 engine starts per year **or**
  - less than 2 operating hours per engine start **or**

- Fast Ramp-Up option

Document code (coding)



Coding list	
TCG 2016 C	WP 1 1 - z
TCG 3016	WP 1 2 - z
TCG 2020	WP 2 1 - z
TCG 2020 K	WP 2 2 - z
TCG 2020 (1.0)	WP 2 4 - z
TCG 3020	WP 2 5 - z
TCG 2032	WP 3 1 - z
TCG 2032B	WP 3 2 - z

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Assignment table

Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 2016 C				
	Continuous operation	1500 (50)	High	WP **11-1**
			Medium	WP **11-1**
			Low	WP **11-2**
		1800 (60)	High	WP **11-1**
			Medium	WP **11-1**
			Low	WP **11-2**
	Flexible operation	1500 (50)	High	WP **11-3**
			Medium	WP **11-3**
			Low	-----
		1800 (60)	High	WP **11-3**
			Medium	WP **11-3**
			Low	-----

Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 3016				
	Continuous operation	1500 (50)	High	WP **12-1**
			Medium	WP **12-2**
			Low	WP **12-3**
		1800 (60)	High	WP **12-1**
			Medium	WP **12-2**
			Low	WP **12-3**
	Flexible operation	1500 (50)	High	WP **12-4**
			Medium	WP **12-4**
			Low	-----
		1800 (60)	High	WP **12-4**
			Medium	WP **12-4**
			Low	-----

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Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 3016				
Configuration S				
	Continuous operation	1500 (50)	High	WP **12-2**
			Medium	-----
			Low	-----

Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 3016				
Configuration PH				
	Continuous operation	1500 (50)	High	WP **12-5**
			Medium	-----
			Low	-----

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Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 2020				
	Continuous operation	1500 (50/60)	High	WP **21-1**
			Medium	WP **21-1**
			Low	WP **21-2**
	Flexible operation	1500 (50/60)	High	WP **21-3**
			Medium	WP **21-3**
			Low	-----
	Fast Ramp-Up option	1500 (50)	High	WP **21-3**
			Medium	WP **21-3**
			Low	-----

Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 2020 K				
	Continuous operation	1500 (50/60)	High	WP **22-1**
			Medium	-----
			Low	-----
	Flexible operation	1500 (50/60)	High	WP **22-2**
			Medium	-----
			Low	-----

Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 2020 (1.0)				
	Continuous operation	1500 (50/60)	High	WP **24-1**
			Medium	WP **24-2**
			Low	WP **24-3**
	Flexible operation	1500 (50/60)	High	WP **24-4**
			Medium	WP **24-4**
			Low	-----

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Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 3020				
	Continuous operation	1500 (50)	High	WP **25-1**
			Medium	WP **25-2**
			Low	WP **25-3**
	Flexible operation	1500 (50)	High	WP **25-4**
			Medium	WP **25-4**
			Low	-----

Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 2032				
	Continuous operation	1000 (50)	High	WP **31-1**
			Medium	WP **31-2**
			Low	WP **31-3**
		900 (60)	High	WP **31-1**
			Medium	WP **31-2**
			Low	WP **31-3**

Engine type	Usage type	Speed (Hz)	Gas quality	Maintenance schedule
TCG 2032B				
	Continuous operation	1000 (50)	High	WP **32-1**
			Medium	-----
			Low	-----
		900 (60)	High	WP **32-1**
			Medium	-----
			Low	-----

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Maintenance schedule

The maintenance work indicated in the maintenance schedule presupposes that the installation, intended use and operating conditions comply with all requirements stated.

The local operating conditions must be taken into account right from the projection phase.

The combustion gases are classified into various gas quality groups by their accompanying substances and their effects on the wear.

For more information on the gas qualities and limit values of the combustion gases, see

- Operating Manual ⇒ General ⇒ Operating media regulations
  - Technical Bulletin (TR) 3017 Specification for fuel gas

To guarantee the service lives, the composition of the combustion gas must be determined at regular intervals by means of a comprehensive gas analysis. The maintenance intervals may need to be shortened accordingly depending on the results of the gas analysis.

The specified maintenance work must be completed once the specified maintenance intervals have elapsed.

The maintenance work is illustrated on separate pages to improve readability. These can be used as the master copy.

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Personnel

A range of competence levels (CL) have been introduced to be able to provide the specialist personnel with appropriate information.

The maintenance work must only be carried out by specialist personnel with the corresponding competence level or qualification.

The maintenance work is indicated accordingly in the maintenance schedule.

1 are maintenance activities for which the specialist personnel must have the minimum requirement CL1

2 are maintenance and repair activities for which the specialist personnel must have the minimum requirement CL2

3 are maintenance and repair activities for which the specialist personnel must have the minimum requirement CL3

Q are assembly and repair activities for which the specialist personnel must have the minimum requirement for qualified specialist personnel

The job card numbers are specified in the maintenance schedule. The operational procedures are described on the corresponding job cards.

For further information on the specialist personnel and competence levels, see:

- Service Info Technology (SIT) 7011 Services and competencies for the maintenance of products of Caterpillar Energy Solutions GmbH
- Operating Manual ⇒ General ⇒ Safety regulations
  - Personnel - Qualifications and Duties

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Definition of the maintenance work

Exchanging

Replacing components with new and exchange parts.

Adjusting

Setting dimensions, pressures, etc.

Additional work to replace components may be necessary.

Draining

Draining liquids (e.g. condensation).

Replacing

Replacing components, operating materials, etc.

Reworking

Material removal within the permitted tolerances for maintaining a required condition.

Checking

Checking according to criteria on the job card.

If one or more criteria are not satisfied, the cause must be determined and the required target state reinstated.

Cleaning

Clean components manually or automatically.

Additional work to replace components may be necessary.

Visually inspecting

Visual inspection according to criteria on the job card.

If one or more criteria are not satisfied, the cause must be determined and the required target state reinstated.

Overhauling

Reworking of components by qualified specialist personnel.

Maintaining

Carrying out maintenance according to job card.

Additional work to replace components may be necessary.

Changing

Changing components, operating media, etc. (e.g. lube oil).

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Exchanging cylinder heads according to requirements

General information

For all maintenance schedules without a defined maintenance level for exchanging the cylinder heads, the following example is used to calculate the exchange interval.

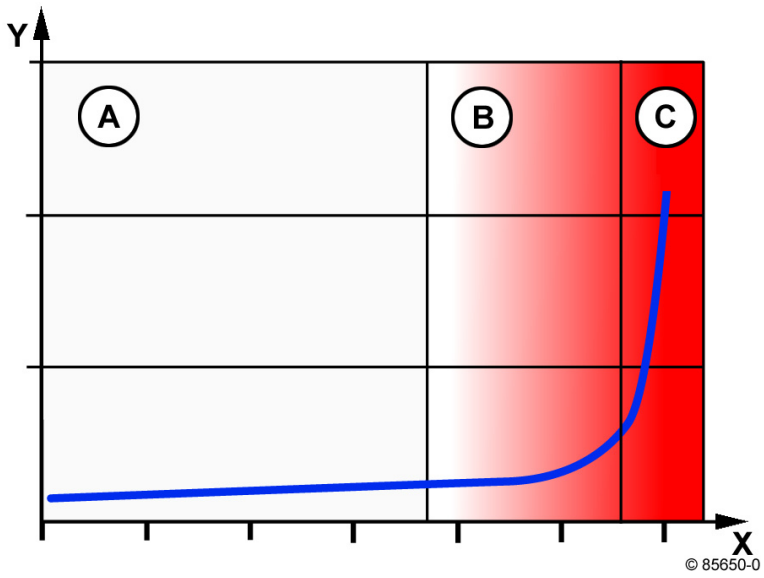
The valve recession must be observed in order to assess the wear on the cylinder heads. Each individual cylinder head is to be examined separately here.

The time for exchanging each individual cylinder head can be determined according to requirements through regular inspection of the valve recession.

If the wear limit of the valve recession is reached according to the technical data, the affected cylinder heads are to be exchanged.

The enclosed data sheet must be used for documentation.

In the data sheet, the entry fields to be filled in are highlighted and released for digital processing.



A 1

The valve wear is very low at the start (area A).

The valve wear increases slowly with increasing operating life (area B).

If both seats are attacked, the valve wear increases at an extremely fast rate (area C).

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Example:

The first cylinder head exchange is to be carried out after a maximum of 32000 oh.

The change interval to aim for after this is also 32000 oh.

If individual cylinder heads are exchanged or replaced at an earlier time, the operating hours for exchange and the maintenance interval are added together.

Every individual cylinder head is to be examined separately here.

Representation of the exemplary calculation

Cylinder	First exchange after (no. of oh)	Next exchange at the latest after (no. of oh)	Second exchange after (no. of oh)	Next exchange at the latest after (no. of oh)
	Time of first exchange max. 32000 oh	Intended time of the next exchange First exchange + 32000 oh	Actual time of the second exchange	Intended time of the next exchange Second exchange + 32000 oh
	24000 oh	24000 oh + 32000 oh 56000 oh	46000 oh	46000 oh + 32000 oh 78000 oh

Representation of the exemplary table entries

Cylinder	First exchange after (no. of oh)	Next exchange at the latest after (no. of oh)	Second exchange after (no. of oh)	Next exchange at the latest after (no. of oh)
	24000 oh	**56000** oh	**46000** oh	**78000** oh

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Service Information

This document was created digitally and is valid without a signature.

This is a translation of the German original. All translations are based on the German original.

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O&M Weekly Checks

Date:Site: EXAMPLE **Engineer:** SW – Service Engineer

Spark Plugs **On Site** Whitwick 20

616/2016/3016	620/2020/3020	632/2032	MWM Energy. Efficiency. Environment.	Unit 2	Unit 1
X	X	X	Engine Run Hours	57706	84300
X	X	X	KW Hours	31370049	31360967
X	X	X	Oil Hrs	159	143
X	X	X	Load	100%	55%
X	X	X	Starts	3101	5139
X	X	X	CH4 Value %	%	%
X	X	X	H2S Value PPM	(PPM)	54 (PPM)
X	X	X	Gas Pressure (mbar)	140 (mbar)	180 (mbar)
X	X	X	Last Service Hrs	57616	83999
X	X	X	Next Service Due Hrs:	59116	85500
X	X	X	Service Type Due	E30	E30
X	X	X	Record power limit %	100%	55%
X	X	X	Visual check for oil leaks	☐	☐
X	X	X	Visual check cooling systems for leaks	☐	☐
X	X	X	Visual check blast coolers & fans for blockages	☐	☐
X	X	X	Inspect alternator air filters/Grill for contamination	☐	☐
X	X		Check UPF Filter Pressure As Per Doc B3-1-9	☐	☐
X			Drain breather oil separator (Racor breather system)	☐	☐
		X	Check system for air leaks		
		X	Drain water from air start tanks		
		X	Check start air compressor oil level		
X	X	X	Check air filter indicators	☐	☐
X	X	X	Check clean oil tank level	60%	60%
X	X	X	Check waste oil tank level	50%	90%
X	X	X	Are oil sample bottles required		
X	X	X	Are oil sample labels required		
X	X	X	T207 Record jacket water temp in	70°C	80°C
X	X	X	P497 Jacket water outlet pressure	(bar)	1.5 (bar)
X	X	X	T206 Record jacket water temp out	83°C	87°C
X	X	X	T202 Intercooler temp in (Tem EVO)	40°C	28°C
X	X	X	T201 Receiver temperature A/B	51/°C	40/°C
X	X	X	G197 Throttle position A/B	40%/%	50%/%
X	X	X	T203 Air inlet temperature	20°C	27°C
X	X	X	P145 Crankcase Pressure	0 (mbar)	0 (mbar)
X	X	X	T289 Heating water return temperature	75°C	84°C
X	X	X	T291 Heating water Flow	92°C	88°C
X	X	X	T208 Lube oil temperature	91°C	92°C
X	X	X	P196 Lube oil pressure before filter	5 (bar)	4.7 (bar)
X	X	X	P302 Lube oil pressure after filter	(bar)	(bar)
X	X	X	T459 Alt bearing temp A	°C	°C
X	X	X	T460 Alt bearing temp B	°C	°C
X	X	X	Check engine cell/control room ventilation fans/filters	☐	☐
X	X	X	Record lowest/highest spark energy (Tem Evo)	94 / 104	94 / 100
X	X	X	Checking for knocking in message log (Tem Evo)	☐	☐
X	X	X	Has engine been de-rating	No	No
X	X		Check starter battery charge and condition	☐	☐

X	X	X	Take oil sample	☐	☐
X	X	X	Check gas booster/drain water from filtration system	☐	☐
X	X	X	Has the engine/control rooms been cleaned		
X	X	X	Is fire and gas alarm system healthy		
X	X	X	Reset Black Box	☐	☐

Comments:

Photos

Unit 1

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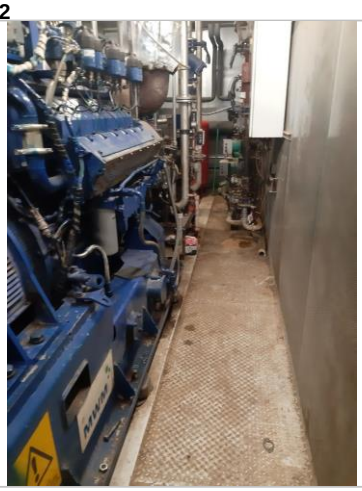
Unit 2



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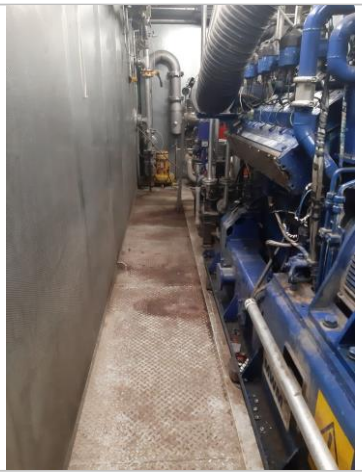

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Maintenance schedule — Overview of intervals

For information on the assignment and validity of the maintenance schedule:
see Technical Bulletin (TR) 2167

Operating hours	Maintenance level							
	E1	E10	E20	E30	E40	E50	E60	E70
as specified	x							
50		x						
4000					x			
8000					x			
12000					x			
16000					x			
20000						x		
20300		x						
24000					x			
28000					x			
32000					x			
36000					x			
40000							x	
40300		x						
44000					x			
48000					x			
52000					x			
56000					x			
60000						x		
60300		x						
64000					x			
68000					x			
72000					x			
76000					x			
80000								x

Maintenance schedule — Overview of intervals

Maintenance schedule E1

Maintenance work	Remark	As specified	CC	JC
Clean genset		if required	1	B 0-3-6
Lube oil system, complete lube oil analysis and replace lube oil		according to Technical Bulletin (TR) 2105	1	B 8-1-3
Coolant system, complete coolant analysis and replace coolant		according to Technical Bulletin (TR) 2091	1	B 9-1-3
Check engine preservation (preservation, application of new corrosion protection, depreservation)		according to Technical Bulletin (TR) 2116	1	
Maintain crankcase breather (model UPF)	Complete a control measurement after replacing filter inserts	Complete limit value measurement every 4000 OH, at the latest replace after 16000 OH	1	B 3-1-9
Replace intake air filter	If the low pressure limit value is reached, if the filter surface is damaged	at the latest after 8000 OH	1	B 6-3-6
Carry out test run	If the engine was not run in operational readiness within a month	Monthly	1	B 0-1-4
Service the battery	If the engine was not run in operational readiness within a month	Monthly	1	B 13-4-1
Combustion gas system, sample taking and gas analysis	In accordance with Technical Bulletin (TR) 3017	every 4 months	1	B 7-18-1
Check coolant	according to Technical Bulletin (TR) 2091	every 8000 OH	1	B 9-1-1
Exchange cylinder heads*	when the max. valve clearance in accordance with technical specifications is reached	between 20000 OH and 40000 OH	2	W 1-4-4
Run in the engine	After replacing pistons or cylinder liner	if required	3	W 0-1-3
Replace or exchange starter		if required	3	W 13-3-2
Exchange exhaust turbocharger, standard overhaul		every 20000 OH	3	W 6-6-4
Exchange exhaust turbocharger, major overhaul		every 80000 OH	3	W 6-6-4

Maintenance schedule E1

Maintenance schedule E10

Maintenance work	Remark	CC	JC
Complete test and functioning run		1	B 0-1-7
Inlet and outlet valves, check valve clearance and set		1	B 1-1-1
Inlet and outlet valves, check valve depth	Cylinder head mounted	1	B 1-7-10

Maintenance schedule E10

Maintenance schedule E20

Maintenance work	Remark	CC	JC
Visually inspect system		1	B 0-1-5

Maintenance schedule E20

Maintenance schedule E40

Maintenance work	Remark	CC	JC
Complete auxiliary device test		1	B 0-1-6
Complete test and functioning run		1	B 0-1-7
Inlet and outlet valves, check valve clearance and set		1	B 1-1-1
Inlet and outlet valves, check valve depth	Cylinder head mounted	1	B 1-7-10
Check speed governor control linkage		1	B 5-4-2
Check throttle valve		1	B 7-23-3
Lube oil system, replace lube oil filter		1	B 8-10-4
Replace spark plug		1	B 13-5-4
Exhaust gas system, check pollutant emissions		3	W 0-1-9
Check ignition timing		3	W 13-5-3

Maintenance schedule E40

Maintenance schedule E50

Maintenance work	Remark	CC	JC
Complete auxiliary device test		1	B 0-1-6
Complete test and functioning run		1	B 0-1-7
Inlet and outlet valves, check valve clearance and set		1	B 1-1-1
Inlet and outlet valves, check valve depth	Cylinder head mounted	1	B 1-7-10
Check speed governor control linkage		1	B 5-4-2
Check throttle valve		1	B 7-23-3
Lube oil system, replace lube oil filter		1	B 8-10-4
Replace coolant	according to Technical Bulletin (TR) 2091	1	B 9-0-4
Replace spark plug		1	B 13-5-4
Exhaust gas system, check pollutant emissions		3	W 0-1-9
Visually inspect combustion chamber	Using an endoscope	3	W 0-2-7
Check engine mount		3	W 3-7-1
Check exhaust pipe		3	W 6-1-1
Visually inspect mixture cooler	Using an endoscope	3	W 6-4-11
Clean gas/air mixer		3	W 7-22-4
Check ignition timing		3	W 13-5-3
Check starter pinion and gear ring on the flywheel		3	W 12-6-4

Maintenance schedule E50

Maintenance schedule E60

Maintenance work	Remark	CC	JC
Complete auxiliary device test		1	B 0-1-6
Complete test and functioning run		1	B 0-1-7
Inlet and outlet valves, check valve clearance and set		1	B 1-1-1
Inlet and outlet valves, check valve depth	Cylinder head mounted	1	B 1-7-10
Check speed governor control linkage		1	B 5-4-2
Check throttle valve		1	B 7-23-3
Lube oil system, replace lube oil filter		1	B 8-10-4
Replace coolant	according to Technical Bulletin (TR) 2091	1	B 9-0-4
Check rubber expansion joint		1	B 12-3-2
Replace spark plug		1	B 13-5-4
Exhaust gas system, check pollutant emissions		3	W 0-1-9
Check vibration dampers, hose lines and flexible lines		3	W 0-3-4
Crankshaft, check axial clearance		3	W 2-1-4
Check con-rod bushing		3	W 2-3-7
Replace con-rod bearing		3	W 2-5-3
Check con-rods		3	W 2-3-5
Replace piston (complete)		3	W 2-9-8
Replace viscosity torsional damper		3	W 12-1-4
Replace cylinder liner		3	W 3-3-2
Check flange seat of cylinder liners and water compartments		3	W 3-10-4
Check engine mount		3	W 3-7-1
Replace valve tappet		3	W 4-2-3
Camshaft, check axial clearance		3	W 4-1-4
Visually inspect camshaft	Camshaft installed	3	W 4-5-8
Check exhaust pipe		3	W 6-1-1
Clean mixture cooler		3	W 6-4-7
Clean gas/air mixer		3	W 7-22-4
Check electric cabling, cable set plug and sensor system		3	W 13-1-4
Check ignition timing		3	W 13-5-3
Check starter pinion and gear ring on the flywheel		3	W 12-6-4

Maintenance schedule E60

Maintenance schedule E70

Maintenance work	Remark	CC	JC
Complete auxiliary device test		1	B 0-1-6
Complete test and functioning run		1	B 0-1-7
Inlet and outlet valves, check valve clearance and set		1	B 1-1-1
Inlet and outlet valves, check valve depth	Cylinder head mounted	1	B 1-7-10
Check speed governor control linkage		1	B 5-4-2
Check throttle valve		1	B 7-23-3
Lube oil system, replace lube oil filter		1	B 8-10-4
Replace coolant	according to Technical Bulletin (TR) 2091	1	B 9-0-4
Replace spark plug		1	B 13-5-4
Exhaust gas system, check pollutant emissions		3	W 0-1-9
Check vibration dampers, hose lines and flexible lines		3	W 0-3-4
Check crankshaft		3	W 2-1-7
Replace crankshaft sealing ring (drive side)		3	W 2-2-2
Replace crankshaft sealing ring (free side)		3	W 2-2-4
Replace con-rod bearing		3	W 2-5-3
Replace con-rods		3	W 2-3-6
Replace main bearing seal rings		3	W 2-7-7
Replace piston (complete)		3	W 2-9-8
Replace viscosity torsional damper		3	W 12-1-4
Replace cylinder liner		3	W 3-3-2
Check flange seat of cylinder liners and water compartments		3	W 3-10-4
Check engine mount		3	W 3-7-1
Replace valve tappet		3	W 4-2-3
Renew valve train		3	
Replace camshaft		3	W 4-5-5
Check and clean gear drive		3	W 4-4-15
Speed control, exchange actuator		3	W 5-4-5
Check exhaust pipe		3	W 6-1-1
Replace exhaust compensators		3	W 6-1-11
Clean mixture cooler		3	W 6-4-7
Overhaul gas/air mixer		3	W 7-22-3
Lube oil system, replace pressure control valve		3	W 8-11-16
Replace lube oil pump		3	W 8-4-5
Check electric cabling, cable set plug and sensor system		3	W 13-1-4
Replace rubber expansion joint		3	W 12-3-1
Check ignition timing		3	W 13-5-3
Check starter pinion and gear ring on the flywheel		3	W 12-6-4
Camshaft, replace bearing		Q	

Maintenance schedule E70

Note in all months that are not 'grey' the mentioned service activity will be provided. In the months that are grey, this activity will not be done and is also not prescribed maintenance.
The schedules will be revised in consultation with the CLIENT, based on new insights on the maintenance, changes in the installation and prescriptions and/or changes in prescriptions from manufacturers of the equipement.

Maintenance list	Responsible	January	February	March	April	May	June	July	August	September	October	November	December
Solid feeding system bin 01													
Inspect oil seals mixing auger main gearbox	CONTRACTOR												
Change oil mixing auger main gearbox	CONTRACTOR												
Change oil electric motor reduction gearbox	CONTRACTOR												
Inspect auger knives	CONTRACTOR												
Inspect welds of auger segments	CONTRACTOR												
Check stainless steel liner for damage	CONTRACTOR												
Inspect auger column	CONTRACTOR												
Inspect drive shafts	CONTRACTOR												
Inspect hydraulic and other hoses	CONTRACTOR												
Lubricate inner and outer tube	CONTRACTOR												
Solid feeding system output 01; horizontal - vertical - diagonal screw													
Visual inspection	CONTRACTOR												
Bearing Lubrication	CONTRACTOR												
Cleaning	CONTRACTOR												
Change oil gearboxes	CONTRACTOR												
Inlet and outlet to be checked on wear of defect	CONTRACTOR												
ctric wiring and control unit to be controlled and tested	CONTRACTOR												
Solid feeding system bin 02													
Inspect oil seals mixing auger main gearbox	CONTRACTOR												
Change oil mixing auger main gearbox	CONTRACTOR												
Change oil electric motor reduction gearbox	CONTRACTOR												
Inspect auger knives	CONTRACTOR												
Change oil electric motor reduction gearbox	CONTRACTOR												
Inspect auger knives	CONTRACTOR												
Inspect welds of auger segments	CONTRACTOR												
Check stainless steel liner for damage	CONTRACTOR												
Inspect auger column	CONTRACTOR												
Inspect drive shafts	CONTRACTOR												
Inspect hydraulic and other hoses	CONTRACTOR												
Lubricate inner and outer tube	CONTRACTOR												
Solid feeding system output 02; horizontal - vertical - diagonal screw													
Visual inspection	CONTRACTOR												
Bearing Lubrication	CONTRACTOR												
Cleaning	CONTRACTOR												
Change oil gearboxes	CONTRACTOR												
Inlet and outlet to be checked on wear of defect	CONTRACTOR												
ctric wiring and control unit to be controlled and tested	CONTRACTOR												

Liquid storage tank 01A - 0EGF20 BB001													
Visual inspection	CONTRACTOR												
Bearing Lubrication	CONTRACTOR												
Clean e-motor	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Change oil gearbox	CONTRACTOR												
Liquid storage tank 02A - 0EGF21 BB001													
Visual inspection	CONTRACTOR												
Bearing Lubrication	CONTRACTOR												
Clean e-motor	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Change oil gearbox	CONTRACTOR												
Liquid storage tank 03 - 0EGF22 BB001													
Visual inspection	CONTRACTOR												
Bearing Lubrication	CONTRACTOR												
Clean e-motor	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Change oil gearbox	CONTRACTOR												
Sanitation tank													
Visual inspection	CONTRACTOR												
Check for cracks mounting flange	CONTRACTOR												
Check vibrations agitator	CONTRACTOR												
Bearing Lubrication	CONTRACTOR												
Clean e-motor	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Clean e-motor	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Change oil gearbox	CONTRACTOR												
Primary Digester 01- 0EFB10 BB001													
Overall visual inspection	CONTRACTOR												
Inspect all drilled hole seals	CONTRACTOR												
Check heating system dearation points	CONTRACTOR												
Change PRV liquid if ambient temp is close to freezing	CONTRACTOR												
Check condition of pipework	CONTRACTOR												
Primary Digester 02- 0EFB20 BB001													
Overall visual inspection	CONTRACTOR												
Inspect all drilled hole seals	CONTRACTOR												
Check heating system dearation points	CONTRACTOR												
Change PRV liquid if ambient temp is close to freezing	CONTRACTOR												
Check condition of pipework	CONTRACTOR												

Secondary Digester 01- 0EFB50 BB001													
Overall visual inspection	CONTRACTOR												
Inspect all drilled hole seals	CONTRACTOR												
Check heating system dearation points	CONTRACTOR												
Change PRV liquid if ambient temp is close to freezing	CONTRACTOR												
Check condition of pipework	CONTRACTOR												
Double membrane roofs 2 primary digesters + 1 secondary digester													
Overall visual inspection	CONTRACTOR												
Inspect all bolts and fixtures for damage	CONTRACTOR												
Check roof level unit	CONTRACTOR												
Clean roof air blowers	CONTRACTOR												
Paddle mixers; 3x primary digesters 01, 3x primary digesters 02, 1x secondary digester													
Clean E-motor	CONTRACTOR												
Oil change	CONTRACTOR												
Control oil level gearbox	CONTRACTOR												
Grease bearing and seal	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Submersible mixers; 3x primary digesters 01, 3x primary digesters 02, 1x secondary digester													
Measure insulation resistance (8000 hrs)	CONTRACTOR												
Check the power cables (8000 hrs)	CONTRACTOR												
Visually inspect the schackel/lifting rope (8000 hrs)	CONTRACTOR												
Check the sensors (16000 hrs)	CONTRACTOR												
General overhaul (every 5 years/40000 hrs)	CLIENT												
After storage tank 01A													
Overall visual inspection	CONTRACTOR												
Inspect all drilled hole seals	CONTRACTOR												
Check condition of pipework	CONTRACTOR												
Measure insulation resistance (8000 hrs) submersible mixer	CONTRACTOR												
Check the power cables (8000 hrs) submersible mixer	CONTRACTOR												
Visually inspect the schackel/lifting rope (8000 hrs) submersible mixer	CONTRACTOR												
Check the sensors (16000 hrs) submersible mixer	CONTRACTOR												
General overhaul (every 5 years/40000 hrs) submersible mixer	CLIENT												
After storage tank 02A													
Overall visual inspection	CONTRACTOR												
Inspect all drilled hole seals	CONTRACTOR												
Check condition of pipework	CONTRACTOR												
Measure insulation resistance (8000 hrs) submersible mixer	CONTRACTOR												
Check the power cables (8000 hrs) submersible mixer	CONTRACTOR												
Visually inspect the schackel/lifting rope (8000 hrs) submersible mixer	CONTRACTOR												
Check the sensors (16000 hrs) submersible mixer	CONTRACTOR												
General overhaul (every 5 years/40000 hrs) submersible mixer	CLIENT												

Condensate pit 01A and 02A													
Cheack floater function	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Flare													
Check electrical connections	CONTRACTOR												
Drain condensate	CONTRACTOR												
check the gas and air-nozzele of the flame optimization, eventually readjust	CONTRACTOR												
check the ignition electrodes (cracks, spallings on the isolator cause failures by wetness)	CONTRACTOR												
clean UV-glas	CONTRACTOR												
Clean E - motor	CONTRACTOR												
Check electrical connections	CONTRACTOR												
control the conditions of the electrical switchboard (condensate?)	CONTRACTOR												
controll anchoring cables	CONTRACTOR												
replace UV-lamp	CONTRACTOR												
clean the flame arrester (with compressed air or exhaust steam device)	CONTRACTOR												
check ignition-cable, protective tube and connector if damaged	CONTRACTOR												
controll the gas-valve, clean the filter and check	CONTRACTOR												
heating system, check cable and thermostat	CONTRACTOR												
Header Container													
Check container air fan	CONTRACTOR												
Control function of valves	CONTRACTOR												
Check operating temperatures and pressures water/glycol pumps	CONTRACTOR												
Check electrical connections water/glycol pumps	CONTRACTOR												
Check general condition water/glycol pumps	CONTRACTOR												
Control pressure indicators	CONTRACTOR												
Check water quality	CONTRACTOR												
Clean container	CONTRACTOR												
Control Container													
Clean control cabinet	CONTRACTOR												
Check filters cabinet door	CONTRACTOR												
Safety loop check	CONTRACTOR												
Air Dryer in control container													
Check if in alarm	CONTRACTOR												
Check cooling rack	CONTRACTOR												
check drain valve	CONTRACTOR												
Air compressor in control container													
Change oil	CONTRACTOR												
Check air filter, replace if necessary	CONTRACTOR												
Check V-belt, replace if necessary	CONTRACTOR												
Antifoam system in control container													
Control function of pumps	CONTRACTOR												
Check tubing connections	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Replace diaphragm	CONTRACTOR												
Check valves for dosing impurities	CONTRACTOR												

External Heat Exchanger													
Overall visual inspection for leaks	CONTRACTOR												
Check operating temperatures and pressures	CONTRACTOR												
Clean if necessary	CONTRACTOR												
Check bolts , tighten if needed	CONTRACTOR												
Containerized oxygen dosing system													
Overall visual inspection	CONTRACTOR												
Clean condenser fins Dryer	CONTRACTOR												
Check electrical absorption.	CONTRACTOR												
Depressurize the dryer. Complete drain maintenance.	CONTRACTOR												
Depressurize the dryer. Replace pre- and post-filter elements.	CONTRACTOR												
Change float drain element dryer	CONTRACTOR												
Change filterset oil/water separator	CONTRACTOR												
Change oil compressor	CONTRACTOR												
Service kit 4000 h compressor	CONTRACTOR												
Service kit 8000 h compressor	CONTRACTOR												
Leakage test	CONTRACTOR												
oxygen analyser, flow meter and other instrumentation	CONTRACTOR												
Check of pneumatic valves	CONTRACTOR												
Check of solenoid valves	CONTRACTOR												
Functional check of electronic devices	CONTRACTOR												
Control of the screw tightening of the PSA	CONTRACTOR												
Replacement of solenoid valves	CONTRACTOR												
Replacement of pneumatic valves (1) (2)	CONTRACTOR												
Inspection/replacement of pressure relief valve	CONTRACTOR												
Inspection of feed air filters	CONTRACTOR												
Replacement of feed air filter cartridges	CONTRACTOR												
Pump skids DP20 - 0EFC20; 0EFC22; 0EFC24; 0EFC26													
Clean E-motor, if necessary	HoSt												
Control oil level gearbox	HoSt												
Check electrical connections	HoSt												
Lubricate pin joints every 10.000 running hours	HoSt												
Pump skid DP60 - 0EFC60													
Clean E-motor, if necessary	HoSt												
Control oil level gearbox	HoSt												
Check electrical connections	HoSt												
Lubricate pin joints every 10.000 running hours	HoSt												

Cutter 0EFC100 AJ001 on Cutter skid 01													
Clean if necessary	CONTRACTOR												
Audible check for smooth running	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Check the functios for leaks	CONTRACTOR												
Check and tighten any loose parts and possible damage	CONTRACTOR												
Checking play betweeen the multi-spline profile and blade holder	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Check oil level quench fluid intermediate chamber	CONTRACTOR												
Change oil in the gearbox and intermediate chamber; every 2 years	CONTRACTOR												
Lobe pump 0EFC100 AP 001 on Cutter skid 01													
Clean if necessary	CONTRACTOR												
Audible check for smooth running	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Check the functions and flow rate	CONTRACTOR												
Check and tighten any loose parts and possible damage	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Check oil level quench fluid intermediate chamber	CONTRACTOR												
Change oil in the gearbox and intermediate chamber; every 2 years	CONTRACTOR												
Cutter 0EFC102 AJ001 on Cutter skid 02													
Clean if necessary	CONTRACTOR												
Audible check for smooth running	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Check the functios for leaks	CONTRACTOR												
Check and tighten any loose parts and possible damage	CONTRACTOR												
Checking play betweeen the multi-spline profile and blade holder	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Check oil level quench fluid intermediate chamber	CONTRACTOR												
Change oil in the gearbox and intermediate chamber; every 2 years	CONTRACTOR												
Lobe pump 0EFC102 AP 001 on Cutter skid 02													
Clean if necessary	CONTRACTOR												
Audible check for smooth running	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Check the functions and flow rate	CONTRACTOR												
Check and tighten any loose parts and possible damage	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Check oil level quench fluid intermediate chamber	CONTRACTOR												
Change oil in the gearbox and intermediate chamber; every 2 years	CONTRACTOR												

Cutter 0EFC104 AJ001 on Cutter skid 03													
Clean if necessary	CONTRACTOR												
Audible check for smooth running	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Check the functios for leaks	CONTRACTOR												
Check and tighten any loose parts and possible damage	CONTRACTOR												
Checking play betweeen the multi-spline profile and blade holder	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Check oil level quench fluid intermediate chamber	CONTRACTOR												
Change oil in the gearbox and intermediate chamber; every 2 years	CONTRACTOR												
Lobe pump 0EFC104 AP 001 on Cutter skid 03													
Clean if necessary	CONTRACTOR												
Audible check for smooth running	CONTRACTOR												
Check electrical connections	CONTRACTOR												
Check the functions and flow rate	CONTRACTOR												
Check and tighten any loose parts and possible damage	CONTRACTOR												
Check oil level gearbox	CONTRACTOR												
Check oil level quench fluid intermediate chamber	CONTRACTOR												
Change oil in the gearbox and intermediate chamber; every 2 years	CONTRACTOR												

MAINTENANCE ACTION	TIME INTERVAL					
	Every day Client	Every week Client	Every 2000 hours, Bright	Every 4000 hours, Bright	Every 8000 hours, Bright	Every 16000 hours, Bright
CHECK						
Low pressure						
Check the water flow		▲				
Drain the overpressure device and refill the vessels		▲				
CO2 compression section						
Check oil level and refill consumed oil	▲					
Check the correct discharge of condensate drain	▲					
Check that both noise and vibration levels are normal	▲			▲		
Enter the observed operating data into the operations log	▲			▲		
Check operating hours CO2 compressor		▲		▲		
Check the motor functions		▲		▲		
Check complete installtion for CO2 leakage		▲		▲		
Check complete installation					▲	
Testing safety cut out					▲	
Inspection of coupling and allignment					▲	
Checking corrosive pipe line					▲	
Checking isolation					▲	
Operation test					▲	
Dryer and purifyer						
Check dew point	▲					
Check outlet temperature during regeneration	▲					
Check CO_2 purity	▲					
Check all settings and adjustments of instruments				▲		
Check operation of all valves				▲		
Check carbon filters and in case change the complete charge						▲
Refrigeration & Liquefaction section						
Check working conditions	▲					
Check the oil heater	▲					
Check complete installation for refrigerant leaks		▲				
Check safety guards		▲				
Check refrigerant oil proporties and exchange if required					▲	
Check that both noise and vibration are normal	▲			▲		
Enther the observed operating data into the operations log	▲			▲		
Check the oil level in the oil separator	▲			▲		
Check the refrigerant charge	▲			▲		
Check the motor functions		▲		▲		
Testing safety cut out					▲	
Inspection of coupling and allignment					▲	
Check oil filter oil separator					▲	
Inspection of configuration UNISAB					▲	
Checking corrosive pipe line					▲	
Checking isolation					▲	
Checking oil level					▲	
Operation test					▲	
Condensors						
Check unit for unusual noise or vibrations	▲					
Check the operating water level in the cold water sump	▲					
Inspect spray nozzles and heat tranfer section	▲					
Clean the debris from unit		▲				
Clean and flush sumps		▲				
Clean sump strainer		▲				
Check and adjust sump water level		▲				
Inspect heat transfer section		▲				
Inspect the spray nozzles		▲				
Check and adjust fan belt tension		▲				
Check and adjust bleed rate		▲				
Check oparation of make-up valve		▲				
Inspect the Refrigerant evaporative condeser					▲	
Inspect/adjust TDS and chemical dosing units (by client)					▲	
E-motors						
Check motor for unusual noise	▲			▲		
Check motor foundation bolts if work loose	▲			▲		
Carry out megger test (by client)					▲	
Inspect stator, rotor shaft, ventilator and terminal box (by client)					▲	
Pumps						
Check pump for water leakage	▲				▲	
Check pump for unusual noise	▲				▲	
Record pressures in logbook	▲				▲	

Inspection of coupling and allignment					▲	
CLEAN						
Low pressure						
Dismount the sight glasses and clean the vessels				▲		
Clean stainless steel filler material gas washer				▲		
CO2 compression section						
Clean oil filter			▲			
Examine and clean valves			▲			
Dryer and purifyer						
Drain powder from filter		▲				
Clean filter		▲				
Clean or replace filter elements				▲		
Refrigeration & Liquefaction section						
Inspect and clean the E-motor					▲	
Condensors						
Clean the debris from unit		▲				
Clean and flush sumps		▲				
Clean sump strainer		▲				
E-motors						
Clean the motor with rag	▲					
REPLACE						
CO2 compression section						
change valves plates spring and springplates				▲		
Change oil					▲	
Change motor grease					▲	
Replacement of oil filter element					▲	
Dryer and purifyer						
Replace filter elements				▲		
Check carbon filters and in case change the complete charge						▲
Change filling of driers						▲
Refrigeration & Liquefaction section						
Check refrigerant oil proporties and exchange if required					▲	
Check refrigerant and exchange if required					▲	
Replacement of oil filter element					▲	

Notes:

Above schedule is indicative. Works/services will only be done if needed. The schedule can be revised in case of new insights.

Extra oil changes as a result of insufficient cleaning excluded.

Corrective maintenance (other or more ofthen replacement than prescribed maintenance in table above) excluded.

BIJLAGE 2
AARD EN OMVANG VAN DE WERKZAAMHEDEN
(INSTALLATIE: GASOPWERKING)

MAINTENANCE ACTION	ONDERHOUDSACTIE	TIME INTERVAL					
		Every day Client	Every 2000 hours, HoSt	Every 4000 hours, HoSt	Every 8000 hours, HoSt	Every 16000 hours, HoSt	Every 24000 hours, HoSt
CHECK (Remedy if Necessary)							
Any gas leaks	Eventuele gaslekken		▲	▲	▲	▲	▲
Any oil leaks	Eventuele olielekken	▲	▲	▲	▲	▲	▲
Oil temperature	Olie temperatuur	▲	▲	▲	▲	▲	▲
Oil level	Oliepeil	▲	▲	▲	▲	▲	▲
Oil flow on oil scavenge visor	Olieretourstroom op kijkglas	▲	▲	▲	▲	▲	▲
Delivery pressure	De druk van de levering	▲	▲	▲	▲	▲	▲
Water inlet and outlet temperature	Temperatuur waterinlaat en -uitlaat		▲	▲	▲	▲	▲
Pressure drop at deoiler cartridge	Drukval bij oliefilterpatroon		▲	▲	▲	▲	▲
Ambient temperature	Omgevingstemperatuur		▲	▲	▲	▲	▲
Tightness of electrical connections	Dichtheid van elektrische aansluitingen		▲	▲	▲	▲	▲
Adequate ventilation	Voldoende ventilatie		▲	▲	▲	▲	▲
Motor current absorption	Opname van motorstroom		▲	▲	▲	▲	▲
Elastic element wearing	Slijtage van het elastische element			▲	▲	▲	▲
CLEAN/ Schoonmaken							
External parts of gas / oil radiator	Externe onderdelen van gas/olie radiator		▲	▲	▲	▲	▲
External parts of electric motor	Externe onderdelen van elektromotor		▲	▲	▲	▲	▲
REPLACE/Vervangen							
Oil filter cartridge	Oliefilterpatroon				▲	▲	▲
Gas filter cartridge	Gasfilterpatroon				▲	▲	▲
Deoiler cartridge	Olie separatorfilter				▲	▲	▲
Oil (Liter)	Olie (liter)				▲	▲	▲
Filter cartridges	Filterpatronen				▲	▲	▲
Suction valve kit	Aanzuigklep revisieklep set				▲	▲	▲
Oil scavenge visor	Olie-kijkfgas				▲	▲	▲
Minimum pressure valve kit	Kit minimumdrukventiel				▲	▲	▲
Thermostatic valve kit	Kit thermostatische kleppen				▲	▲	▲
Active carbon	Actieve koolstof				▲	▲	▲
Elastic element – coupling	Elastisch element - koppeling						▲
Screw block overhaul kit	Revisiekit schroefblok						▲
Motor bearings kit	Kit motorlagers						▲

Preventive maintenance membranes, piping, valves and instrumentation Preventief onderhoud membramen, pijpen, kleppen en instrumentatie							
Gas chromatograph	Gaschromatograaf	Weekly Calibration by SCADA-system					
Valves and piping	Kleppen en leidingen			▲	▲	▲	▲
Sensoren	Sensoren			▲	▲	▲	▲
Chiller	Koelmachine			▲	▲	▲	▲
Calibration gas	Kalibratie gas	▲	▲	▲	▲	▲	▲
Preventive maintenance Biogas analyser (pronova) Preventief onderhoud Biogas analyser (pronova)							
CHECK (Remedy if Necessary)	CONTROLE (indien nodig verhelpen)		▲	▲	▲	▲	▲
Filter-set for SSM6000	Filterset voor SSM6000				▲	▲	▲
Diaphra. Gas pump 830	Diafragma. Gaspomp 830					▲	
H2S sensor S-200	H2S-sensor S-200					▲	
Sensor Electronics	Elektronica sensor					▲	
O-2 Sens. w/o gas distrib.	O-2 Sens. zonder gasverdeler						▲
CH4-Sensor	CH4-sensor	Every 40.000 hours					
CO2-Sensor	CO2-sensor	Every 40.000 hours					
Fan 60x60	Ventilator 60x60	Every 40.000 hours					
Aqua Stop Filter	Aqua Stop Filte				▲	▲	▲
Preventive maintenance Biomethane analyser (pronova) Preventief onderhoud Biomethaan (pronova)							
CHECK (Remedy if Necessary)	CONTROLE (indien nodig verhelpen)		▲	▲	▲	▲	▲
Filter-set for SSM6000	Filterset voor SSM6000				▲	▲	▲
Diaphra. Gas pump 830	Diafragma. Gaspomp 830					▲	
H2S sensor S-50	H2S-sensor S-200					▲	
Sensor Electronics	Elektronica sensor					▲	
O-2 Sens. w/o gas distrib.	O-2 Sens. zonder gasverdeler						▲
CH4-Sensor	CH4-sensor	Every 40.000 hours					
CO2-Sensor	CO2-sensor	Every 40.000 hours					
Fan 60x60	Ventilator 60x60	Every 40.000 hours					
Aqua Stop Filter	Aqua Stop Filter				▲	▲	▲

Notes:

Above schedule is indicative. Works/services will only be done if needed. The schedule can be revised in case of new insights.
The schedule for oil changes are based on adequate clearning of biogas with active carbon.
Extra oil changes as a result of insufficient cleaning excluded.
Corrective maintenance (other or more ofthen replacement than prescribed maintenance in table above) excluded.

Opmerkingen:

Bovenstaand schema is indicatief. Werkzaamheden/diensten zullen alleen worden uitgevoerd indien nodig. Het schema kan worden herzien in geval van nieuwe inzichten. Het schema voor olieverversingen is gebaseerd op adequate reiniging van biogas met actieve kool.
Extra olieverversingen als gevolg van onvoldoende reiniging uitgesloten.
Correctief onderhoud (vaker vervangen dan voorgeschreven onderhoud in bovenstaande tabel) uitgesloten.

Appendix V

Environmental Permit (to be addeded later)