

Section 1.
Environmental Management System Manual

For The

Anaerobic Digester

At

Much Fawley Farm, Fawley, Herefordshire HR1 4SP



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Appendices

All additional reference materials are found with the Management System Folder EMS. For ease of reference the EMS Section 1 Index identifies the location of these documents within the folder.

Record of Changes

See EMS Section 3 Record of Changes Sheet.

Much Fawley Farm

Introduction

The aim of the Environmental Management System Manual (EMS Manual) is to identify and minimise risks of pollution. The EMS Manual contains information on the organisation's activities, products and services and the organisation's management structure. It also acts as an index for locating key documents (e.g. procedures). The EMS Manual shows the organisation's capacity to comply with its environmental policy and, along with supporting documents, serves as an internal reference for staff.

An electronic copy of this folder can be found in the Farm Office at Much Fawley Farm. The physical copy can be found in the Control Room at the digester site. A duplicated physical copy can also be found in the Farm Office at Much Fawley Farm wit

A. SCOPE

The Installation is a 370kW Anaerobic Digester situated at Much Fawley Farm, Herefordshire. This farm is adjacent to the River Wye in an east-west aligned valley forming part of a larger mixed agricultural holding, with a number of residential properties surrounding. This plant consists of the following components:

- Feedstock Storage Clamps
- Static Diet Feeder
- Primary Digester
- Secondary Digester
- CHP Engine
- 2nd CHP Engine
- Technical Link Building between Digesters
- Gas Holding Vessel
- Digestate Separator
- Digestate Storage Lagoon
- Digestate Storage Tank
- Site Pumping Station
- Boiler (Operates as Emergency Flare)
- Incinerator (Operates as Emergency Flare)

APPENDIX A – SITE PLAN

ATSS Drawing Ref: “01180-00-F Site Plan With Services” Drawing Ref 000000000– shows the as built layout. In addition, schematic “Drainage Plan and Site Detail” to help with appreciation of services and layout.

The Environmental Management System (EMS) currently covers the buildings and land listed above, and not the remainder of the farming enterprise at this site.

The main activity of the Installation is the digestion of organic feedstock to produce Biomethane. This is then burnt to produce electricity which is then exported onto the National Grid. The digestate remaining after the completion of the digestion process is then collected for onward use as fertiliser.

Description of Waste Operations:

R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary Storage, pending collection, on the site where it is produced).

R3: Recycling / reclamation of organic substances which are not used as solvents.

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

D10: Incineration on land.

B. REFERENCES

The EMS Manual was originally written following the guidance of the Environment Agency Environmental Management Toolkit, and is intended to be used in order to ensure compliance with the Environment Agency Permit issued for this installation, as well as to act as a tool for continual environmental improvement of this installation.

Additional references taken from:

- Develop a Management System
- Control and Monitor Emissions for your Environmental Permit.

C. ENVIRONMENTAL MANAGEMENT SYSTEM REQUIREMENTS**- Planning**

Nigel Green is responsible for the EMS and its ongoing review.

Nigel Green has investigated current activities and associated impacts.

Training needs are identified and activities are initiated. Information located in **EMS Section 31**.

- Impacts, Plans and Controls

The organisation’s environmental aspects, impacts and legal requirements are identified and environmental plans and controls established to meet the objectives and targets set. **EMS Section 8**.

Environmental Policy.

The environmental policy gives the organisation's commitment to legal compliance, continual environmental improvement and the prevention of pollution in a public statement. **EMS Section 9.**

- Operation

Resources are in place and roles, responsibility and authority are assigned. See **EMS Section 41**. Training is conducted and competence assessed, communication is addressed, and all EMS documentation is controlled by Nigel Green. Operations are also controlled, and a clear Accident /Pollution & Incident Management Plan is in place and updated by Nigel Green **EMS Section 10**. **EMS Section 12** also contains alarm procedures and emergency contacts in the event of any plant issue.

- Checking & Correcting

Audit procedures are in place to verify that the environmental policy and the objectives and targets are being fulfilled. Annual EA Review and self audit done by Nigel Green. Non-conformances are recorded as part of the EA Review or entered into **EMS Section 50** Accident Record and corrective actions implemented.

1. Planning

This Environmental Management System has been established in order to ensure full environmental compliance of this installation and a route for continual improvement of operations. Using the forms in the **EMS** a record is kept of the present status of all aspects of the installation. These are reviewed by Nigel Green and are as listed below.

2. Impacts, Plans and Controls – APPENDIX B

2.1 Legal and other requirements

EMS Section 36 Environmental Permit has a copy of all relevant legislation. Nigel Green Environmental Manager will review these. Items included are:

EMS Section 49 holds a list of the legislation applicable to this site.

Details of the legislation, together with other obligations for schemes which the operator has registered for, which is relevant to the activities at this installation are kept at the top of **EMS Section 8** Top of Table 1 in Appendix B.

2.2 Environmental aspects

EMS Section 8 Table 1 Identifies all of the processes, activities and equipment forming part of this installation, together with the relative impact each item has on the environment. This is then expanded in Tables 2A to 2G to detail the potential impact of each item and how it is controlled. Table 3 lists all waste produced on the site and how it is processed. Table 4 lists the procedures as identified in Table 2A to 2G above. This information is then cross populated with the site Project Risk Register, a copy of which is included within **EMS Section 38**.

The comments box for each item is then used to produce an Environmental Action Plan for any improvement of the project operations. **EMS Section 39**.

2.21 Individual component descriptions and environmental

Digester Tanks

A - Consult installed an aqua tank as part of the initial construction for the Fre-energy digester. The tank has a volume of 1567m³ less freeboard and is constructed of individual pre cast concrete panels installed as a polygon onto a concrete base slab. Panels are held by a single strand tendon that secures into a buttress panel. The as built structure has EPDM sealant strips placed between the vertical panels and the base of the vertical panels are secured into a concrete ring beam all complying with BS EN 1992 -1 -1 Eurocode 2 ensuring no risk to the wider environment.

Further information can be found in the Digester Tank CQA information and A-Consult user manual found in **EMS Section 17 and 30**. The user manual also includes construction drawings in Appendix 1 showing construction details of the base construction, wall construction and the sealing of all elements prior to water testing. Following the user manual is a copy of the Written Scheme of Examination including a record of repairs and any monitoring required. Any copies of inspections are recorded here as well.

Engineering certificate of competence was supplied dated 30 August 2010 by A-Consult Limited.

Environmental impact will be minimised by inclusion within maintenance checklist and tanks signed off as fit for purpose.

Feedstock Clamps

Please refer to CQA Report in **EMS Section 18**. The plan shows the construction details of the as built site. To ensure clamp integrity the clamp was constructed over a membrane and features a perimeter leak detection system which runs to a visual inspection chamber on the south east corner of the clamp before ultimately entering the below ground effluent tank in the south west corner of the site but within the perimeter bund and indicated on the '01180-03-B Wall and Floor Construction' drawing. Perimeter walls feature the leak detection membrane running below the perforated pipe and this being below the concrete floor and wall slab. Visual checks in the inspection chambers (south east and west corners) will ascertain if there is a leakage issue these checks will be carried out as part of the routine maintenance schedule as per **EMS Section 27**. With issues recorded in Appendix G. The concrete pad to wall construction has expansion joint and water bar installed. Expansion joints feature sleeved dowel bar to ensure water tightness while allowing slab flexibility. Clamps and pad were constructed by Hartpury Construction.

Tanks are routinely inspected as part of the maintenance schedule **EMS Section 27** and checked for integrity when emptied.

Environmental Impact is minimised by routine checks in maintenance checklist, leak detection and monitoring, fit for construction sealed waterbars, expansion joint sealant and sleeved dowel bar seals in floor concrete pad.

Concrete surfaces

Please see CQA report **EMS Section 19**. Concrete surfaces outside of the clamps feature the same construction methods as indicated for the floor construction of the silage clamps. Visual inspections **EMS Section 27** are made as part of the routine checklist. An integral 1.0mm HDPE membrane underlies all concrete areas and expansion joints and waterbar are fitted as indicated on the '01180-03-B Wall and Floor Construction' drawing" **EMS Section 19**. These concrete surfaces drain to the south east corner of the yard to the below ground effluent tank. This tank pumps to a choice of locations – under the slats to assist slurry movement, to the slurry pit at the rear of the digester, or the digestate storage lagoon reception pit.

Environmental impact is minimised by membrane under concrete, visual checks, surface drainage to underground effluent tank and containment in process, water bar and expansion sealing plus sleeved dowel bar sealing.

Perimeter Bunding

Perimeter bunding is constructed as per the “Bund Construction” plan found in **EMS Section 20**. The bund has been constructed as per these plans in a location as indicated on the 01180-00-F” plan (Bund Calculations) **EMS Section 20**. The constructed bund will be checked for integrity as per daily checklist **EMS Section 27**. The bund will achieve a 1723.7m³ minimum containment capacity excluding freeboard and the actual available capacity of this can be seen in the “01180-00-F” plan (Bund Calculations) **EMS Section 20**. The 0.3m fall over the site has been discounted within the calculations and deductions made for the access ramp and poultry muck store. The bund will run from the end of the southern silage clamp wall and run due south (outside the existing soil bund). It will then run parallel across to the to the gas holder and then be constructed around the gas holder before then running to the end of the dairy shed adjacent to the most westerly digester tank.

Liquid Digestate Lagoon

In order to comply with required storage capacities the emergency storage lagoon has been converted into a lined storage tank. Construction details are found within **EMS Section 21** “CQA Digestate Lagoon”. The tank has been constructed according to CIRIA and SSAFO the panels supplier is Milbury and consists of individual pre stressed concrete panels individually sat in a cradle and held in place with temporary props. Design and installation details are in section CA. The base concrete pad is then laid and the props removed. The void between the panels and the wall is concrete filled to ensure integrity and fit for purpose.

The tank will be used to store digestate pumped from the 2nd digester during AD plant operation as well as site drainage as required. Liquid will enter the tank either by the collection pit pump or internal pipework over the wall routed over the wall. The collection pit is located to the south west corner of the tank.

Leak detection pipework and membrane are installed below the concrete level. The membrane seals beneath the concrete base and up the walls and within this sealed area the leak detection pipework can collect any leaked liquids which will collect in an inspection chamber on the south west corner of the digestate store. Any collected liquids can be inspected as part of the weekly maintenance schedule by manually operating the pump. In typical operation the liquids will be automatically pumped into the reception pit as required. The reception pit will pump into the digestate store as required. See **EMS Section 21** for further information.

Environmental impact is minimised by fit for purpose construction (signed of CQA), leak detection system and ensuring freeboard requirement is met. Lagoon is currently not covered. A cover is planned to further minimise odour and Ammonia losses.

Positive leak detection results to be recorded in **EMS Section 27** Maintenance sheets and any negative results in EMS Section with EA notification as per permit requirements **EMS Section 36** (Schedule 5 Notification)

Digestate Storage Tank – Circular Above Ground Tank

In order to comply with 25% additional storage capacities, the emergency storage lagoon has been converted into a lined storage tank. Construction details are found within **EMS Section 22** "CQA Digestate Lagoon". The tank has been reconstructed on site having previously been used as temporary storage off site as part of land application of the digestate. Tanks have been constructed by *****according to CIRIA and SSAFO. Tank structure individual lined metal panels bolted together and located on a concrete pad. Design and installation details are in **EMS Section 22**. Tank construction features a membrane beneath the concrete pad and leak detection pipework.

The tank will be used to store digestate pumped or tankered from the Liquid Digestate Lagoon during AD plant operation. Liquid will enter the tank either by the irrigation main or tanker and pumped over the wall.

Leak detection pipework and membrane are installed below the concrete level. The membrane seals beneath the concrete base and up the walls and within this sealed area the leak detection pipework can collect any leaked liquids which will collect in pipework on the south west corner of the stores location. Any collected liquids can be inspected as part of the weekly maintenance schedule by visual inspection. See **EMS Section 27** for further information.

Environmental impact is minimised by fit for purpose construction (signed of CQA), leak detection system and ensuring freeboard requirement is met.

Positive leak detection results to be recorded in **EMS Section 27** Maintenance sheets and any negative results in EMS Section with EA notification as per permit requirements **EMS Section 36** (Schedule 5 Notification)

Boiler / Incinerator

Boiler installed to utilise gas burned during flaring when plant not operational. Automated operation at over pressure or when CHP is not operational. Limited need as there is a second CHP on site in the event of CHP shutdown. The boiler is used to heat water within the dairy unit (when in operation) and the poultry unit. The capacity of both is sufficient to cope with the whole gas volume during CHP shutdown. As an additional redundancy the incinerator can be used if the boiler is on operational maintenance but with 2 CHP engines and the boiler the need has not arisen for this as yet.

2.3 Objectives, targets & programmes

Environmental Action Plan (**EMS Section 39**), Any environmental objectives and targets for the installation that reduce its impacts on the environment can be listed here. Each objective should have at least one or more measurable targets for improvement with time-scales.

The Environmental Manager annually establishes the organisation's environmental objectives based on:

- the organisation's environmental policy;
- requirements of the EMS;
- legal requirements;
- significant environmental aspects;
- revisions of the EMS;
- contents of the Environmental Action Plan;
- technological options;
- financial and operational requirements;
- the views of interested parties.

The Environmental Manager is responsible for establishing, implementing and maintaining an environmental management programme to meet these targets. If there are changes in the activities, products and services, legislative changes, etc, then the Environmental Manager reviews the installation and amends the EAP together with the Objectives, Targets and Programmes, as necessary.

3. Operation

3.1 Resources, roles responsibility and authority

The individuals and committees responsible for implementing the EMS are shown in fig.1. The details of the roles and responsibilities associated with the EMS are as follows:

Installation Management

- **Nigel Green**

Environmental Manager

- **Nigel Green**

- See Table 3.1 for individual roles

Staff

- **Tony Sadler – Daily operation**
- **Stephen Haines – Cover Daily Operation and Maintenance**
- **Charlie - Cover Daily Operation**

- See Table 3.1 for individual roles

Suppliers/Contractors

- **Chris Morris**
- **Nick Sutton**

- The organisation's suppliers/contractors should satisfy the Environmental Manager that they are conforming to the relevant environmental procedures.
- Provide the Environmental Manager with appropriate operational control records.

Table 3.1 Individual Responsibilities

Individual	Nigel Green	Tony Sadler	Stephen Haines	Charlie
Role	Site Manager Environmental manager Permit Holder	Operator	Relief Operator	Relief Operator
Site Management	√			
Avoidance, recovery and disposal of wastes produced by the site	√			
Operating Techniques	√	√	√	√
Emissions and Monitoring and Reporting	√			
Odour, Noise Monitoring	√	√	√	√
Record Keeping	√	√	√	√
Reporting	√			
Operations and Maintenance	√	√	√	√
Forktruck Operation	√	√	√	√
Environmental Manager	√			
Management System Implementation	√	√	√	√
Management System Review	√			
Alarm Response	√	√	√	
Complaint Recording	√	√	√	
Equipment Servicing	√	√	√	
Routine Checks	√	√	√	
Clamp management	√			
Waste Returns Submission	√			
Project Risk Register Review	√			
Permit Compliance	√			
Accident Record Completion	√	√	√	
Training Checklist Review	√			
Environmental Impacts Review	√			
Diet Feeder Filling	√	√	√	√
Engine Servicing	√	√	√	
Flare Servicing	√			

3.2 Competence, training and awareness

A copy of the permit is kept on site at the installation within the EMS. Documentation stating who is in charge of ensuring compliance with each part of the permit and other relevant legislation and guidance is kept in **EMS Section 31 and 41** and will be used to record this information.

The training checklist and record forms (**EMS Section 31**) ensure training requirements are met. This section also contains a Training Matrix to be reviewed annually.

Also in **EMS Section 32**, there is also a delegation of responsibilities form. This form is to be used when a member of staff is away from work, for example annual leave, on long term sick leave or on maternity leave. This will ensure that the duties normally carried out by that person are delegated to another suitably trained person.

EMS Section 37 includes an induction for visitors and / or contractors. Visitor Site induction is initiated by a notice on entry to site about the site rules and gives a list of contacts to ring to gain access to the site. As part of this contact any site specific information is given which would include referencing key sections of the management system. **EMS Section 37** also includes a copy of the Visitor sheet which should be completed by all visitors.

EMS Section 33 includes a Permit to work system is based on signing in and out only with prior authority. Management system is used to make contractors aware of site specific hazard and risks.

3.3 Operational control

Operation and Maintenance of the site is an important aspect of the running of the site. Staff members identified in section 3.1 are all involved in this aspect of site operations.

All staff have been instructed in the operation and maintenance of the site and are aware of the safety aspects required when carrying out these checks and maintenance. Nigel Green has ultimate operational control and all other staff members report to Nigel Green.

All staff members use a checklist **EMS Section 27** produced by Nigel Green to simplify the daily checking process. This checklist incorporates the requirements of the Freenergy Operations and Maintenance Manual **EMS Section 28** and the MAN / HABO BV CHP Operations and Maintenance Manual **EMS Section 29**, A-Consult Tank User Manual **EMS Section 30** as well as well as other key plant component maintenance manuals. Cross referencing using the Tanks and Clamps Maintenance Schedules **EMS Section 27** will help ensure all aspects covered. The Accident Record **EMS Section 11** should be used for recording any actions taken and by whom.

The checklist found in **EMS Section 27** is to be completed on a daily, weekly, monthly basis and the individual Operation and Maintenance manual sections are included within the checklist pack for the staff member to refer to.

The staff members will check the daily, weekly and monthly relevant section within the individual Maintenance Manuals (marked as Plant – Freenergy Operations Manual / Engine – MAN Maintenance Plan / Tanks and Clamps – A Consult Tank Management Plan and Clamps (Physical checks to ensure integrity)) and put a tick or cross in the boxes if any issues discovered. If any issues discovered the details are included within the 'Description' column and the cause in the 'Cause' column. The initials of the person having done the checks will then

be put in the final column. This person is responsible for notifying Nigel Green, completing any paperwork required and activating any remediation required.

To simplify the process the checklist also includes a section on 'Odour', 'Spillages' and 'Accidents'. To carry out the checks the relevant Appendixes are also available for reference when doing the checks. In a similar method to above any issues can be recorded using the 'Description' and 'Cause' columns and initialled to show who carried out the check and who then notifies Nigel Green of any issues found. With Odour incidents the 'Wind Direction' and 'Severity' should also be completed if necessary.

Odour assessments will be based on the Odour Management Plan (**EMS Section 00**).

Any separate odour assessments that are carried out should use the **Odour Management Plan Section 40** Odour Assessment Report Form which is on Pg 23 of the Odour Management Plan.

In the event of a complaint use the complaint procedure on page 18 of the **Odour Management Plan** which will then require you to complete the **Odour Management Plan Appendix B** Odour complaint Report Form on Page 24.

Spillage incidents on the site should be assessed and the checklist 'Description', 'Cause' and 'Initials' columns used to record. If additional information is needed to be recorded **EMS Section 11** Accident Record sheets can be used. Any incidents should be reported to Nigel Green. The Accident Plan **EMS Section 10** Emergency Action Procedures should be referred to for individual actions when spillages are found.

Accidents on the site should be assessed and the checklist 'Description', 'Cause' and 'Initials' columns used to record. If additional information is needed to be recorded **EMS Section 11** Accident Record sheets can be used. Any incidents should be reported to Nigel Green. The Accident / Pollution Incident Management Plan **EMS Section 10** should be referred to for individual actions when accidents occur – see 3.4 following.

3.4 Emergency preparedness and response

3.4.1 Accident / Pollution Incident Management Plan – EMS Section 10

In accordance with the Accident Management Plan, if an accident does happen and it may cause an adverse environmental impact, the operator will be expected to:

- immediately do what it says in the accident management plan;
- do whatever else is necessary to minimise the environmental consequences;
- take all precautions to ensure the health and safety of both employees and external people is not compromised;
- find out why the accident happened and take action to stop it happening again;
- Review the accident management plan.

The accident management will be reviewed every 4 years, if management or named responsible people change or as soon as possible after an accident. **EMS Section 10** encloses a complete list of all emergency contacts that may need to be informed if there is an accident. **EMS Section 10** lists all substances and storage facilities which may present a harm to the

environment in the case of an accident. **EMS Section 11** can be used to record any accident details.

3.4.2 Incidents and non-conformances.

EMS Section 36 can be used to record any incidents and accidents.

4. Checking and Correcting

4.1 Monitoring and measurement

4.1.1 Complaints

All complaints received by the installation about site activities will be recorded in **EMS Section 34**. If the site receives a complaint this form should be completed and shown to the Environment Agency when they visit the site. The forms can be used as evidence that any complaints received have been taken seriously and that actions have been taken to rectify any problems identified, especially if the Environment Agency has also received the same complaint.

4.1.2 Odour, noise and emissions management plans

The Environmental Permit for this installation requires the control of pollution including odour, noise and emissions. The potential impacts of these need to be controlled as they can have serious adverse impacts on the environment and human health. There is an Odour Management Plan in place for this installation, a copy of which is enclosed in **EMS Section 40**. Noise emissions from this installation will routinely be less than the adjoining farming enterprise a specific noise management plan has been produced. However, should noise complaints be received then **EMS Section 42 Pg 17** as above and the complaints procedures with the Odour Management Plan shall be followed as applicable. Noise Impact Plan and Emissions Plan is found in **EMS Sections 42, 8 and 43**.

4.2 Evaluation of compliance

The Environmental Manager will audit the installation with regards the contents of this EMS. The period of these reviews shall be no more than every 6 months but shall be adjusted to suit the amount of activities listed on the Environmental Action Plan.

4.3 Nonconformity, corrective action and preventive action

Non conformities identified from section 3.4.2, and any corrective action and preventive action required from this and complaint, action or incident, shall be investigated. This investigation shall include:

- Identification of the causes of the non-conformances.
- Analysis of the causes of the non-conformances to avoid any repetition.
- Actions to implement the necessary corrective actions.
- Assessment of the effectiveness of the corrective and preventive actions.

The results of this investigation will be analysed, fed back to the overall manager and all documentation modified as necessary. **EMS Section 50** will be used for this process.

4.4 Control of records

The original copy of the EMS and a copy of all completed forms shall be kept off site by the Environmental manager. A complete copy together with multiple copies of blank forms shall be retained on site for ease of access by the operators.

Delegation of responsibilities

Name of employee to be absent	
Job title/role to be filled during absence	
Absence type e.g. Annual leave.	
Name of employee covering absences role	
Part/s of permit employee is responsible for	
Any other responsibilities the employee will be covering.	
Length of time cover will be for.	
Any training required to enable employee to cover the role effectively and competently.	