

1. Introduction

This document is the Environmental Management Plan for the Five Fords WwTW Gas to Grid Facility. This document details significant environmental impacts and methods used for their control.

This content of this document is communicated to all relevant staff. In addition, this document is communicated to any contractor or temporary personnel who are performing activities within the boundaries of this site. A copy of this plan is located in the main administration office.

This document is owned by the Ops Co-Ordinator and will be reviewed annually or in the event of significant operational changes that may have an impact on the environment.

2. Site Description

The Five Fords WWTW Gas to Grid project otherwise known as the Biomethane Injection Plant (BIP), comprises of three main packages. The Biogas Upgrade Plant (BUP), the Grid Entry Unit (GEU) and the Propane Storage and Transfer Plant (PSTP). The BIP is intended to take biogas produced from the anaerobic digestion (AD) of the sewage sludge for enhancement, to allow direct injection of Biomethane into the national grid. The purpose of the BUP is to clean the biogas of contaminants deemed harmful to the natural gas grid and reduce carbon dioxide content, thereby increasing the calorific value (CV) of the gas so that it can be designated as biomethane. After the biomethane is passed through two sets of activated carbon filters (ACFs) which remove volatile organic compounds (VOCs), siloxanes and hydrogen sulphide (H₂S), it is passed to the grid entry unit where a small amount of propane is added to produce the enriched biomethane with a CV compatible with that required by the Gas Network Operator. Prior to injection into the gas grid network, the enriched biomethane is monitored, analysed and odorised in the GEU as per the legal requirement.

3. Significant Environmental Impacts

The significant environmental impacts identified at Five Fords G2G plant include;

- Pollution to land/air
- Energy Consumption
- Consumption of chemicals/materials
- Waste Disposal
- Noise and Vibration

4. Potential Sources of Pollution

Following a site assessment, the following have been identified as possible causes of pollution;

- Pollution to land via waste storage and disposal
- Pollution to land via spillage of chemicals, oils
- Pollution to air via gas leak
- Pollution to air via odour

5. Pollution Prevention and Control

In order to reduce the potential of a pollution incident the following prevention and control methods have been implemented at site:-

5.1. Pollution Prevention

- All staff are trained in the correct handling and storage of chemicals, oils and gasses.
- All staff are made aware of effective waste management and good house-keeping.
- All visitors are inducted and made aware of site rules.
- Chemicals, Oils and Compressed Gasses are ordered from approved supplies in minimal quantities required for operational activities.
- All deliveries are inspected to ensure that the containers are sound. Leaking containers are refused delivery to site.
- All deliveries to site are supervised by trained, authorised staff.
- There is a spill kit located in the MCC Room for the Oil stored in the Compressor Unit.
- A comprehensive maintenance program has been implemented at this site to ensure all plant and process area operate effectively.
- Waste is removed from site by licensed waste carriers.

5.2. Pollution Control

- All drainage returns to the head of the works. This is clarified in a site drainage plan.
- Bulk chemical and diesel is stored within bunds and spill trays that are located away from grass verges.
- Significant spillages are reported as soon as possible and action for clean-up is implemented by trained personnel.
- In the event of a major spillage, e.g. tanker spillage, a specialised contractor would be procured to clear the spill having completed the emergency procedure.
- Emergency procedures have been developed for this site – please refer to the environmental emergency procedures and site plan.
- Maintenance of equipment such as the Flare Stack and Biomethane Plant Stack is annually monitored by a UKAS accredited company.
- Performance of CHP engine efficiency and other parameters as highlighted in section 14 of this document, are annually recorded and reported, as per the permit.
- Alarms around the site trip if there is a gas leak.

6. Bunds on Site

All bunds are visually checked monthly to ensure they are free from rainwater and other debris and to ensure there are no signs of weakness or areas where contained liquids can escape. Bunds are manually pumped out, oil contaminated rainwater is disposed of in compliance with the Hazardous Waste Regulations.

Bund to contain Spillage of	Bund Material	Location
Oil/Water	Metal Unit (Package Plant)	The Compressor Unit
Hydraulic Oil	Rock bed beneath the transformer	The Transformer

7. Waste

Waste generated on this site includes and is segregated into;

- Scrap Metal
- Waste Oils
- General waste
- Fluorescent Tubes
- Waste chemical containers
- WEEE
- Batteries
- Gas Canisters

6.1 Waste Management

Five Fords has a designated waste management area located in front of the cabins just outside the boundary of the Digestion Plant. All skips and containers are located on a hardstand to prevent leaching. Skips and containers are clearly labelled.

6.2 Records

All waste removed from site is covered by signed transfer notes. These records are stored in the main administration office at Five Fords WWTW in accordance with regulatory requirements.

6.3 Waste Reduction Initiatives

To reduce volumes of waste, the Gas Canisters for Nitrogen etc. are sent back to the supplier for re-use upon delivery of new canisters.

8. Waste Carriers

WEEE, Fluorescent Tubes, Batteries, Waste Oils and Oil contaminated items such as oily rags are being treated as hazardous waste as in accordance with legislation, these are removed from site by an approved supplier procured through SRM.

Waste Carrier	Waste Carriers Registration Number	Waste Carriers License Expiry Date	Waste Removed

9. Hazardous Waste

Five Fords is a registered Hazardous Waste Site.

Registration Number	Expiry Date
ACQ687	08/10/2015

10. Energy

Power sources at Five Fords WWTW include:

- Mains Electricity
- CHP generated electricity
- Solar Panels

The main energy used at Five Fords WwTW are mains electricity. Five Fords uses energy from the grid to power the site as Five Fords WWTW Gas to Grid project priority is to inject all Biomethane back into the grid via Wales & West Utilities at the Grid Entry Unit (GEU). Electricity is monitored and recorded by the DCWW energy team. Companywide initiatives are in place to reduce power consumption as well as on-site training in how to reduce local energy consumption such as unnecessary lighting, etc.

11. Chemicals

In order to undertake operational activities, the following chemicals/materials are used, they are stored in either a bund/spill tray/gas tank unless otherwise stated that they are part of the process.

Chemical	Grade	Quantity/Process
Glycol	Mono Ethylene Glycol	20 Litre Drums
Bio Gas	60 % CH ₄ , 38% CO ₂ , 2% N ₂ & O ₂ .	(From the Gas Holder)
Bio-Methane Gas	mainly CH ₄	(Injected at the GEU)
Hydrogen Sulphide	H ₂ S	(H ₂ S is removed through the ACFs)
Liquefied Propane Gas (LPG)	C ₃ H ₈	3 x 9000L (water capacity)
Odorant for gas	Odorant NB	40kg
Compressed Nitrogen	99.99% N ₂	20 x 50L cylinders
Calibration Gas	Type 4 Calibration Gas Mixture	3 x 50L cylinders
Oil	Engine Oil	30L

All chemicals are purchased via approved suppliers; these suppliers are monitored and controlled by DCWW.

12. Site Security

Five Fords WWTW is a Critical National Infrastructure (CNI) site, therefore there is high security in place and access through the automatic gates is through a keyfob or by contacting control room from the gate if the visitor is expected. There are further gates to the Digestion Plant which are kept locked at all times. No mobile phones or cameras are permitted as per the site induction, due to the potentially explosive hazardous areas marked up in the DSEAR survey. See drawing in section 16 for a site layout/drainage drawing.

13. Ecology

There are no ecology issues or invasive species present as per ecology report carried out by Avian in May 2014.

14. Environmental Permit

Five Fords Gas to Grid Facility is subject to an Environmental Permit (EPR/AP3139FT) that stipulates monitoring activities for annual monitoring of the 2 x 1.41 MW CHP engine exhaust stacks, the 2 x Dual fuel standby boiler exhaust stacks, the Siloxane removal unit, the Waste gas burner (Flare Stack) and the Biomethane Plant Stack.

Further process monitoring requirements are to continuously measure the Hydrogen Sulphide and Methane in the Biogas supplied to the engines via a monitoring point in the biogas feed line, and lastly to continuously monitor the Gas Holder for leak detection of Methane via a monitor which detects between two membranes of the gas holder.

Emissions limits include:

Emission Point	Parameter 1	Parameter 2	Parameter 3
CHP Stack 1 & 2	Carbon Monoxide – 1400 mg/m ³	Nitrogen Oxides – 500 mg/m ³	Total VOC's – 1000 mg/m ³
Standby boiler exhaust operating on Biogas	Carbon Monoxide – 1400 mg/m ³	Nitrogen Oxides – 500 mg/m ³	Total VOC's – 1000 mg/m ³

*Emissions points monitoring only required if CHP plant operates >10% of the time.

Emissions monitoring is carried out annually by a UKAS accredited company.

Reporting performance parameters of the permit include:

Parameter	Frequency	Units
Fuel input to installation (biogas)	Annual	m ³
Fuel input to installation (Natural Gas)	Annual	Tonnes
CHP engine efficiency	Annual	%
Hours of operation for both engines and hours that engines operated in CHP mode	Annual	Hours
Hours run on biogas (steam raising boiler)	Annual	Hours
Hours run on Natural gas (steam raising boiler)	Annual	Hours
Operational hours of waste gas burner	Annual	Hours
Biogas burnt by waste gas burner	Annual	m ³
Operational hours of biomethane Injection Plant	Annual	Hours

15. Environmental Management Plan Tasks

The following table states the overarching objectives and the local tasks that area required to fulfil the objectives. Each task is assigned a completion date and owner.

Objective	Task	Target Date	Owner	CAR Reference

