



Business Management System

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25/01/11

Annual permit report

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| Installation | Silent Valley |
| Permit reference | ZP3535SQ |
| Reporting period | Jan - Dec 2016 |
| Permit Operator | Novera Energy |

Author: Kate Phillips

Date: 20-Jan-17

Authorised to sign as representative of the Operator

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|--|---|--------------------------|-----------------------|
| Fugitive Emissions Review | | Reporting period: | Jan - Dec 2016 |
| Installation Name: | | Permit reference | ZP3535SQ |
| Substances Released/Potentially | Description of event and any contamination/decontamination of the site which has occurred | | |
| Landfill gas | Details of any notifiable events have been submitted to NRW in accordance with our notification procedure | | |
| Spillages | No significant spillages, contamination or decontamination to report for this installation | | |

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| Site Management System Review | |
| Date of recent review / issue | Date next review required* |
| 01/02/2015 | 2017 |

*Site Management Systems (SMSs) incorporate details regarding site protection and monitoring.

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| Site Closure plan review | |
| Date of recent review / issue | Date next review required* |
| 27 February 2015 | February 2019 |

The Permit requires that the site closure plan is reviewed at least every four years

| Raw Materials (& Water) Assessment Table | | | | | | | |
|--|---------------|--------------------------|----------------|-----------------------------------|--|--|--|
| Site: | Silent Valley | Reporting period: | Jan - Dec 2016 | Permit Reference: ZP3535SQ | | | |

| Raw Materials | Application | Current Measures to Ensure Efficiency and Waste Minimisation | Annual Quantity Used | Fate of Material | Environmental Impact Potential | Reason Alternatives are Not Practicable | Details of Process Modifications which Could Result in Savings |
|------------------|---|---|--|------------------|--|--|---|
| Landfill gas | Fuel for engines to produce electricity | Kilowatt generation from volumes processed is maximised through effective operation, maintenance and servicing of plant | Variable depending on site conditions | Combustion | Potentially flammable, explosive, toxic, asphyxiant, ecotoxic, corrosive and odorous, greenhouse gas | N/A - Combustion of landfill gas essential for environmental control | N/A - environmental benefits to be gained from conversion of methane to CO2 |
| Lubricating oils | To ensure efficiency of utilisation plant is maintained in accordance with manufacturer's instructions | Efficient use of lubricating oil is maximised through oil analysis to identify requirement for oil changes | 8000 litres purchased in 2016 | Reprocessing | Ecotoxic and odorous | Specification determined by engine manufacturer to ensure maximum performance and efficiency | Oil used is specialised for landfill gas fuel as recommended by the OEM. Oil change intervals are based on oil analysis therefore maximising efficiency and minimising use |
| Water | Coolant for engine block and domestic water supply | Cooling water is recirculated around the engines to maximise efficiency and minimise consumption | No water supply to site. De-ionised water is supplied to site in IBCs and used to mix coolant | Treatment | Inert | N/A - Inert therefore best practicable environmental option | Re-use of water for coolant purposes ensures volumes used are as low as reasonably practicable. Cleaning practices assessed and minimal volumes used, cleaning practices are infrequent |
| Glycol | Antifreeze for use in coolant water | Glycol is recirculated around the engines to maximise efficiency and minimise consumption | Glycol contained within enclosed-loop system is drained into a container for re-use. OEM* recommends change of glycol every 20,000 hours. Infnis policy is to change following natural depletion or contamination. | Reprocessing | Toxic, ecotoxic | Specification determined by engine manufacturer to ensure maximum performance and efficiency | Antifreeze mix is specific to engine type and pre-determined by the OEM*. Levels are topped-up following natural depletion or contamination |
| Battery Acid | In batteries used for engine start-up and to provide back-up power to ensure rapid restart following any loss of mains power supply | Battery use is essential minimised to the applications listed (see left) | There are typically <10 batteries removed from each gas utilisation plant per year | Recycled | Corrosive | Portable electrical supply required for start-up | Minimal use of battery during start-up only therefore opportunity for savings is insignificant |

*OEM: Original Engine Manufacturer

Waste Minimisation, Recovery and Disposal Assessment

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|---|-----------------------------------|---|
| Installation Name: Silent Valley Gas Utilisation Plant | Permit Reference: ZP3535SQ | Reporting period: Jan - Dec 2016 |
|---|-----------------------------------|---|

| Waste Stream | Application/Source | Current Measures to Ensure Efficiency and Waste Minimisation | Fate of Material | Reason Alternatives are Not Practicable | Details of Process Modifications which Could Result in Savings |
|---|-------------------------------------|---|--------------------------------|--|--|
| Oil Filters (205ltr Drum) (EWC 16-01-07) | Engine maintenance | Predetermined by manufacturers' recommendations to ensure efficiency | Reprocessing | Oil and filtration devices predetermined by manufacturers to ensure efficiency | Not applicable: oil filters changed at pre-determined life based on oil analysis and differential pressure |
| Oil Contaminated Rags & Absorbents (205ltr Drum) (EWC 15-02-02) | Engine maintenance and housekeeping | Control measures in place to prevent spillage | Reprocessing | As above | No further modifications considered possible: Preventative maintenance and procedural practices minimise spillage and the requirement for oil absorbancy products |
| Waste Engine Oil (Bulk) (EWC 13-02-05) | Engine maintenance | Efficient use of lubricating oil is maximised through oil analysis to identify requirement for oil changes | Reprocessing | As above | No further modifications considered possible: Oil used is specific to the landfill gas fuel in use and as recommended by the OEM*. Oil change intervals are based on oil analysis therefore maximising efficiency and minimising use |
| Batteries (EWC 16-06-01) | Engine maintenance | Recharged | Recycled | Batteries essential for engine start-up and ensuring rapid restart | Batteries only replaced when they no longer hold a charge. Maintenance practices are in place to lengthen battery life |
| Fluorescent Tubes (EWC 20-01-01) | Lighting | Replacement when faulty or damaged | Reprocessing | Alternatives not considered practicable due to warm-up time of energy saving bulbs | Tubes are only replaced when they have expired |
| General Waste | Packaging | Waste streams which can be reprocessed or recycled are identified and segregation facilities provided where appropriate | Disposal | Materials not segregated/ reprocessed are produced in small quantities only making alternatives not viable | Not applicable as a result of small quantities only being produced |
| Waste water/effluent | Welfare facilities | Facilities are maintained to ensure minimal water usage | Road tanker to treatment plant | Connection to mains sewer not practical - quantities produced are small. | Not applicable as a result of small quantities only being produced |

*Original Engine Manufacturer

Annual Reporting of Other Performance Indicators

| | | |
|---|-----------------------|---------------------------------------|
| Installation: Silent Valley Landfill Gas Utilisation Plant | | Permit Reference: ZP3535SQ |
| Parameter | Jan - Dec 2016 | Units |
| Gas engine downtime hours | 320 | hrs |
| Gas engine operation hours | 8,440 | hrs |
| Volume of landfill gas combusted | 389,921 | m3 (treated by flare) |
| | 3,752,862 | m3 (treated by engines) |
| | 4,142,783 | m3 (total treated by engines & flare) |

Operator's Comments:

Only one engine running since September 2015. The flare is not regulated by this gas utilisation plant permit.

Reporting of Performance Indicators (Form Ref: PI1)

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|---|-----------------------------------|
| Installation: Silent Valley Landfill Gas Utilisation Plant | Permit Reference: ZP3535SQ |
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Annual Production/Treatment (MWh)

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| Total production of energy | 6659 |
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Environmental Performance Indicators

| Parameter | Annual Average Jan - Dec 2016 | Units | Trends in Environmental Performance | |
|--|-------------------------------|--------|-------------------------------------|------|
| | | | 2014 | 2015 |
| Total oxides of nitrogen (expressed as NO2) emission | 1.9 | Kg/MWh | 1.4 | 0.8 |
| Total carbon monoxide emission | 4.5 | Kg/MWh | 3.1 | 2.7 |
| Total engine downtime (downtime hrs/available operation time in hrs) | 3.7 | % | 14.4 | 46.1 |

| Reporting period | Energy Imported (Primary Energy Usage) (MWh) | Parasitics (MWh) | Energy Exported (MWh) | Energy Used on Site (MWh) | Site Efficiency |
|------------------|--|------------------|-----------------------|---------------------------|-----------------|
| Jan - Dec 2016 | 10.2 | 220 | 6439 | 231 | 33 |

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| Installation: | Silent Valley Landfill Gas Utilisation Plant | Permit Reference: | ZP3535SQ |
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| Accident Management Plan Review | Jan - Dec 2016 |
| Current Review Date | |
| Reviewed monthly following a review of Notifiable Events | |

Permit requires that the accident management plan is reviewed at least every 2 years, or as soon as practicable after an accident (whichever is the earlier).

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| Operator's comments: |
| No accidents occurred during this period which would require amendment to the Accident Management Plan for this installation. |

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| Installation: Silent Valley Landfill Gas Utilisation Plant | Permit Reference: ZP3535SQ |
| Emissions to Air Reporting Jan - Dec 2016 | |
| Report Submission Date | 29-Apr-16 |
| Submitted to | Tyrone Ward |