

**Generic risk assessment for standard rules set number SR2009No4 v3.0**

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| <b>Standard Facility:</b>              | Waste operation: combustion of biogas in engines at a sewage treatment works (<5MW) |
| <b>Location:</b>                       | Applies to all potential locations.   |
| <b>Risk assessment carried out by:</b> | Environment Agency  |
| <b>Date:</b>                           | 06-Apr-12   |

The scope of the permit and associated rules is defined by the following risk criteria:

- Parameter 1 Permitted activities - The storage and recovery of waste (R13, R1) and incineration (D10).
- Parameter 2 Permitted wastes - biogas from sewage sludge digesters.
- Parameter 3 Except for the auxiliary flare, the aggregate rated thermal input of all appliances used to burn biogas must be less than 5 megawatts.
- Parameter 4 Gas engines stacks have to be located 200 metres from any building used by the public including dwelling houses in cases where they do not have an 'effective stack height' of 3 metres as defined by the rules.
- Parameter 5 The activities must not be carried out within 500 metres of a European Site or of a Site of Special Scientific Interest (SSSI) (excluding any SSSI designated solely for geological features).
- Parameter 6 The activities must not be carried out within an Air Quality Management Area (AQMA) designated for NOx.

Abbreviations: SR - Standard Rule  
 NOx - Oxides of nitrogen  
 CO - Carbon Monoxide  
 CHP - Combined heat and power  
 DSEAR - Dangerous Substances and Explosive Atmosphere Regulations 2002  
 SR (emissions of substances not controlled by emission limits) - emissions of substances .... shall not cause pollution...., with appropriate measures:  
 gas engine stack height shall be no less than 3 metres; gas engine exhaust gas temperature where the exhaust leaves the engine shall be no less than 200 degrees C;  
 all biogas condensate shall be discharged into a sealed drainage system; fugitive emissions of biogas shall be prevented.

| Data and information                           |  |   |   | Judgement                   |   |  |                                  | Action (by permitting)                                  |  |
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| Receptor                                       | Source   | Harm  | Pathway   | Probability of exposure     | Consequence   | Magnitude of risk                          | Justification for magnitude      | Risk management   | Residual risk  |
| What is at risk?<br>What do I wish to protect? | What is the agent or process with potential to cause harm? | What are the harmful consequences if things go wrong? | How might the receptor come into contact with the source? | How likely is this contact? | How severe will the consequences be if this occurs? | What is the overall magnitude of the risk? | On what did I base my judgement? | How can I best manage the risk to reduce the magnitude? | What is the magnitude of the risk after management?<br>(This residual risk will be controlled by Compliance Assessment). |

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| Local human population  | Releases of NOx                 | Harm to human health - respiratory irritation and illness. | Air transport then inhalation                           | Low    | Medium | Medium | There is potential for exposure to anyone living close to the site or at locations where members of the public might be regularly exposed.                             | SR - activities shall be managed and operated in accordance with a management system (will include inspection and maintenance of equipment, including engine management systems), Air dispersion modelling indicates that the limitations specified in the rules are acceptable. SR - the activities shall not be carried out within an AQMA designated for NOx. | Low |
| Local human population  | Releases of CO                  | Harm to human health - respiratory irritation and illness. | Air transport then inhalation                           | Low    | Medium | Low    | Monitoring of CO levels in biogas driven CHP plants has shown CO to be typically present at below benchmark levels as indicated in Agency Guidance LFTGN08.            | As above and SR - point source emissions to air with emission limits for CO.   | Low |
| Local human population  | Odour                           | Nuisance, loss of amenity                                  | Air transport then inhalation.                          | Medium | Medium | Medium | Local residents often sensitive to odour. Permit only covers gas engines and not the digestion of sewage.  | SR - emissions shall be free from odour.... SR - (if required) - odour management plan, SR (emissions of substances not controlled by emission limits)...With appropriate measures: fugitive emissions of biogas shall be minimised.   | Low |
| Local human population  | Noise and vibration             | Nuisance, loss of amenity, loss of sleep.                  | Noise through the air and vibration through the ground. | Low    | Low    | Low    | Local residents often sensitive to noise and vibration but there is low potential for exposure.  | SR - emissions shall be free from noise and vibration..... SR (if required) - noise and vibration management plan.   | Low |
| Local human population and / or livestock after gaining unauthorised access to the installation | All on-site hazards: machinery. | Bodily injury  | Direct physical contact                                 | Low    | Medium | Low    | Direct physical contact is minimised by activity being carried out within sewage treatment works and in containerised units so only a low magnitude risk is estimated. | SR - activities shall be managed and operated in accordance with a management system (will include site security measures to prevent unauthorised access).   | Low |

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| Local human population and local environment.  | Arson and / or vandalism causing the release of polluting materials to air (smoke or fumes), water or land. | Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or arsonists/vandals. Pollution of water or land. | Air transport of smoke. Spillages and contaminated firewater by direct run-off from site and via surface water drains and ditches. | Medium | High   | Medium | Although biogas is flammable, risk of direct physical contact is reduced by activity being carried out within sewage treatment works and in containerised units. | As above. SR - management system (will include fire and spillages).  | Low |
| Local human population and local environment   | Accidental fire causing the release of polluting materials to air (smoke or fumes), water or land.          | Respiratory irritation, illness and nuisance to local population. Injury to staff or fire fighters. Pollution of water or land.                    | As above.  | Low    | Medium | Medium | Risk of accidental combustion of waste is moderate.  | As above and safety zoning of areas under DSEAR.   | Low |
| All surface waters close to and downstream of site.                                    | Spillage of liquids, including oil.   | Acute effects: fish kill   | Direct run-off from site across ground surface, via surface water drains, ditches etc.   | Low    | Medium | Low    | Quantities of liquids stored are generally low. Permitted waste type is a gas so a low magnitude of risk is estimated.   | SR - All liquids shall be provided with secondary containment. Run off restricted by SR on emissions of substances not controlled by emission limits.... with appropriate measures: all biogas condensate shall be discharged into a sealed drainage system. | Low |
| All surface waters close to and downstream of site.                                    | As above  | Chronic effects: deterioration of water quality  | As above. Indirect run-off via the soil layer  | Low    | Medium | Low    | As above   | As above   | Low |
| Abstraction from watercourse downstream of facility (for agricultural or potable use). | As above  | Acute effects, closure of abstraction intakes.   | Direct run-off from site across ground surface, via surface water drains, ditches etc. then abstraction.                           | Low    | Medium | Low    | Watercourse must have medium / high flow for abstraction to be permitted, which will dilute contaminated run-off.  | As above   | Low |
| Groundwater  | As above  | Chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole.  | Transport through soil/groundwater then extraction at borehole.  | Low    | Medium | Low    | Quantities of liquids stored are generally low. Permitted waste type is a gas so a low magnitude of risk is estimated.   | As above   | Low |

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| Protected nature conservation sites - European sites and selected SSSIs | Any, but principally NOx. | Harm to protected site through toxic contamination, nutrient enrichment, disturbance etc. | Any | Low | Medium | Low | Emissions to air may cause harm to and deterioration of nature conservation sites. | At 500 metres of a European Site or of a Site of Special Scientific Interest or above, the potential hazards from the permitted activities pose a low risk to the broad sensitivity of species and habitats groups. The standard permit only applies at this distance or more. It is also a requirement of an SR. | Low |
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**Notes:** Red triangle indicates comment containing supporting information  
 Yellow columns contain drop down menus that allow automatic evaluation of risk in green column